रसायन-विज्ञान

भाग 1

उच्चतर माध्यमिक स्कूलों के लिए पाठ्यपुस्तक

टी० आर० शेषाद्रि

प्रोफेसर एमेरिटस
रसायन-विज्ञान विभाग
दिल्ली विश्वविद्यालय
दिल्ली

बी० डी० जैन

प्रोफेसर, रसायन-विज्ञान विभाग
दिल्ली विश्वविद्यालय
दिल्ली

बलभद्र प्रसाद

(भूतपूर्व उपकुलपति)
इलाहाबाद विश्वविद्यालय
साइंस कालेज
पटना

एन० व्ही० सुब्बा राव

प्रोफेसर, रसायन-विज्ञान
और विभागाध्यक्ष
उस्मानिया विश्वविद्यालय
हैदराबाद

रसायन-विज्ञान

भाग 1

उच्चतर माध्यमिक स्कूलों के लिए पाठ्यपुस्तक



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्

अप्रैल 1974 : चैत्र 1896

P. D. 10 T.

मूल्य : रु० 3.00

प्रकाशन विभाग में श्रीमती अंजनी दयानन्द, सचिव, राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्, राष्ट्रीय शिक्षा संस्थान भवन, श्री अरविन्द मार्ग, नई दिल्ली 16 द्वारा प्रकाशित तथा कैक्स्टन प्रेस, रानी झांसी रोड, नई दिल्ली में मुद्रित।

प्रस्तावना

विद्यार्थियों को सही तरह से विज्ञान पढ़ाने के लिए और उनमें विज्ञान के प्रति रुचि उत्पन्न करने के लिए एक अच्छे अध्यापक के बाद एक अच्छी पाठ्यपुस्तक की ही सबसे ज्यादा जरूरत होती है। पाठ्यपुस्तक को न केवल पठनीय और सुबोध होना चाहिए ताकि वह विद्यार्थी को ज्ञात से अज्ञात की ओर ले जाए, बल्कि उसे स्थानीय जरूरतों और परम्पराओं के अनुकूल पाठ्यचर्या की आवश्यकता की भी पूर्ति करने वाला होना चाहिए।

रसायन-विज्ञान अनिवार्यतः एक प्रयोगात्मक विज्ञान है और इसलिए यदि उपयुक्त प्रयोगों की सहायता से इसे पढ़ाया जाए और उसके प्रयोगों को कार्यान्वित करने की विधियों का विवरण भी दिया जाए तो उसको समझना आसान हो जाता है। यद्यपि विज्ञान सार्वभौम होता है तथापि स्थानीय उपलब्ध सामग्री और परिचित उदाहरणों की सहायता से उसको पढाना आसान भी और शैक्षिक सिद्धांतो के उपयुक्त भी है।

सामान्यतः ऐसा महसूस किया जाता है कि भारतीय स्कूलों में रसायन-विज्ञान का अध्यापन समुचित रूप से नहीं हो सका है। इसका कारण पढ़ाने की इस विधि का अभाव तथा पाठ्यपुस्तकों का उपलब्ध न होना रहा है। इसके अलावा हमारे स्कूलों में अच्छे अध्यापकों का अभाव भी सर्वविदित है। इसीलिए उपयुक्त नियोजित पाठ्यपुस्तकों द्वारा इस कमी को पूरा करने की जरूरत का सुझाव दिया गया है।

इसी पृष्ठभूमि को ध्यान में रखकर प्रस्तुत पुस्तक तैयार की गई है। इसमें पाठ्यसामग्री को उपयुक्त प्रयोगो और उदाहरणों की सहायता से विकसित किया गया है। रसायन-विज्ञान से परिचय कराने के लिए हवा और पानी जैसे सुपरिचित पदार्थों को प्रारम्भ बिंदु बनाया गया है।

तत्वों, यौगिकों, मिश्रित पदार्थों, अम्लों, क्षारों और लवणों से सम्बद्ध सिद्धांतों को समझाने के लिए परिचित पदार्थों के उदाहरणों को लिया गया है। प्रयोगों में काम आने वाले उपकरणों को सीधी-सादी डिजायनों को भी दिया गया है। ये प्रयोग स्वयं विद्यार्थियों द्वारा सुविधा से किए या अध्यापकों द्वारा दिखाए जा सकते हैं।

यह पाठ्यपुस्तक की तीन वर्षीय उच्चतर माध्यमिक कक्षाओं के लिए तैयार की गई है। इसका पहला भाग कक्षा नौ, दूसरा कक्षा दस और तीसरा कक्षा ग्यारह के लिए है।

भाग एक में विभिन्न प्रकार के पदार्थों से परिचित कराया गया है और सामान्य वस्तुओं की प्रारंभिक रासायनिक जानकारी दी गई है तथा रसायन-विज्ञान का आणविक और परमाणविक आधार बताया गया है। इस भाग द्वारा रसायन-विज्ञान के मूलभूत सिद्धांतों का प्रारंभिक परिचयात्मक ज्ञान कराया गया है। भाग एक में बताई गई सामान्य धातुओं, अधातुओं, लवणों और कार्बनिक यौगिकों को सामान्यतः स्कूल के संग्रहालय में आसानी से उपलब्ध होना चाहिए और पढ़ाने में उनका उपयोग भी किया जाना चाहिए।

पाठ्यपुस्तक का भाग दो तैयार हो चुका है व भाग तीन तैयार किया जा रहा है। भाग दो में भौतिक नियमों को रसायन विज्ञान में लागू किया जाना समझाया गया है। उनको लागू करने की क्रिया को समझने के लिए अपेक्षित कुछ महत्त्वपूर्ण तत्वों और उनके यौगिकों के रसायन को भी उसमें लिया गया है।

भाग तीन में भी आवर्त सारणी के प्रकाश में तत्वों के रसायन के वर्णन दिए जाएंगे। इसके साथ ही उसमें प्रारम्भिक कार्बनिक रसायन-विज्ञान की विशिष्ट कार्बनिक यौगिकों के दृष्टिकोण से समझाया जाएगा।

हर अध्याय के अंत में प्रश्नों के साथ संक्षिप्त सारांश भी दिया गया है ताकि अध्याय में पढ़ी गई पाठ्यवस्तु का दोहराना हो जाए। पुस्तक के अंत में परिशिष्ट के रूप में कुछ महत्वपूर्ण वस्तुपरक शैली के प्रश्न दिए गए हैं। आशा है कि ये विद्यार्थियों और अध्यापकों द्वारा उपयोगी सिद्ध होंगे।

इस शताब्दी के दौरान रसायन-विज्ञान में बड़ी तेजी से प्रगति हुई है और अनेक विचारों व संकल्पनाओं में परिवर्तन हुए हैं। बहुत-से मामलों में स्पष्टीकरण अधिक तर्कसंगत और सरल हो गए हैं। ये परिवर्तन अब भी हुए चले जा रहे हैं। फलस्वरूप समय-समय पर पाठ्यपुस्तकों में काफी परिवर्तन-संशोधन करने पड़ते हैं। सम्पादक मंडल को उम्मीद है कि इस पाठ्यपुस्तक से आज की जरूरतें पूरी हो सकेंगी और यह पूरे देश में एक मानक स्थापित कर सकेगी। पाठकों से निवेदन है कि वे जो भी सुझाव और समीक्षाएं उचित समझें, हमारे पास भेजें।

विषय-सूची

नोट : परिचय के शीर्षक पृष्ठ 1 पर **द्रव्य** के स्थान पर **द्रव** छप गया है, उसे पाठक कृपया ठीक कर लें।

परिचय

द्रव और इसके रासायनिक प्रकार

इस विश्व की रचना भाँति-भाँति के पदार्थों से हुई है। इनमें से कुछ की रचना सरल है और इन्हें ऐलिमैंट्स या मूलतत्व कहते हैं, कुछ अन्य हैं जो जटिल किस्म के यौगिक हैं। कुछ और भी हैं जो इनके मिश्रण हैं। इनमें से जो सरल और सुलभ हैं उनसे रासायनिक प्रकारों और रासायनिक सिद्धांतों के समझने में सहायता मिलती है। इनमें से ये वस्तुएँ सबसे सुलभ हैं :

1. वायु : यह विभिन्न मूलतत्वों और कुछ यौगिकों का एक प्ररूपी मिश्रण है।

2. जल : यह भी एक प्ररूपी यौगिक है किन्तु रचना में अपेक्षाकृत सरल है।

3. कार्बन, गंधक और फॉस्फोरस : ये तीन ऐसे मूलतत्व हैं जो नित्य के जीवन में बहुत सामने आते हैं। ये प्ररूपी अधातुएँ हैं और ये अम्लीय ऑक्साइड बनाते हैं।

4. धातुएँ : ये अलग श्रेणी में आती हैं और क्षारकीय ऑक्साइड बनाती हैं, जो प्रायः अम्लों में घुल जाते हैं और लवण बनाते हैं। सबसे अधिक प्रयोग में आने वाली धातुएँ हैं; सोना, चाँदी, ताँबा, राँगा, एल्यूमिनियम, पारा, सीसा और लोहा। ये धातुओं के प्ररूपी गुणों और उनके महत्वपूर्ण उपयोगों को प्रकट करती हैं।

5. लवण: ये तब बनते हैं जब धातुओं और अम्लों की एक दूसरे पर अभिक्रिया होती है।

6. कार्बनिक पदार्थ : ये कार्बन के यौगिक हैं।

आगे आने वाले अध्यायों से इन पदार्थों का, इनकी रासायनिक प्रकृति, इनकी रचना और गुणों का, इनके उपयोगों का और उन रासायनिक सिद्धांतों का वर्णन है जो इनके उदाहरणों से समझाए जाते हैं।

अध्याय 1

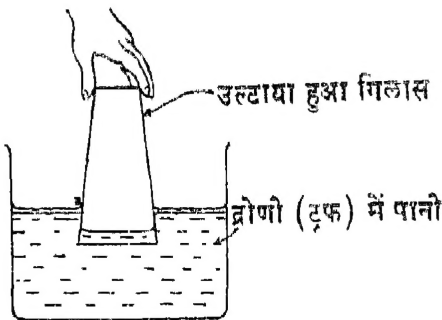
वायु

1.1 वायु द्रव्य है

हम सब वायु से तो परिचित ही है जिसमें हम सदा साँस लेते रहते हैं। पृथ्वी के चारो ओर वायुमंडल है और यह हर जगह एक-सा होता है चाहे मैदान हो या समुद्र या पहाड़। वायु वर्णहीन या बिना रंग की होती है, देखी नही जा सकती। किन्तु इसके अस्तित्व को अनुभव किया जा सकता है और प्रयोग द्वारा दिखाया भी जा सकता है; जैसाकि नीचे के तीन प्रयोगो में बताया गया है।

प्रयोग 1

काँच की एक द्रोणी (ट्रफ) में कुछ पानी भरो और फिर जैसाकि चित्र-1 में दिखाया गया है, एक गिलास को उल्टा करके पानी मे डुबाओ। पानी की सतह से गिलास को नीचे की ओर दबाओ। आप देखेगे कि गिलास मे पानी ऊपर नही चढ रहा है। इससे यह प्रकट होता है कि गिलास में कोई गैस है जो पानी को अपनी जगह लेने से रोकती है। यह गैस वायु ही है और यह संपीडन का प्रतिरोध करती है।



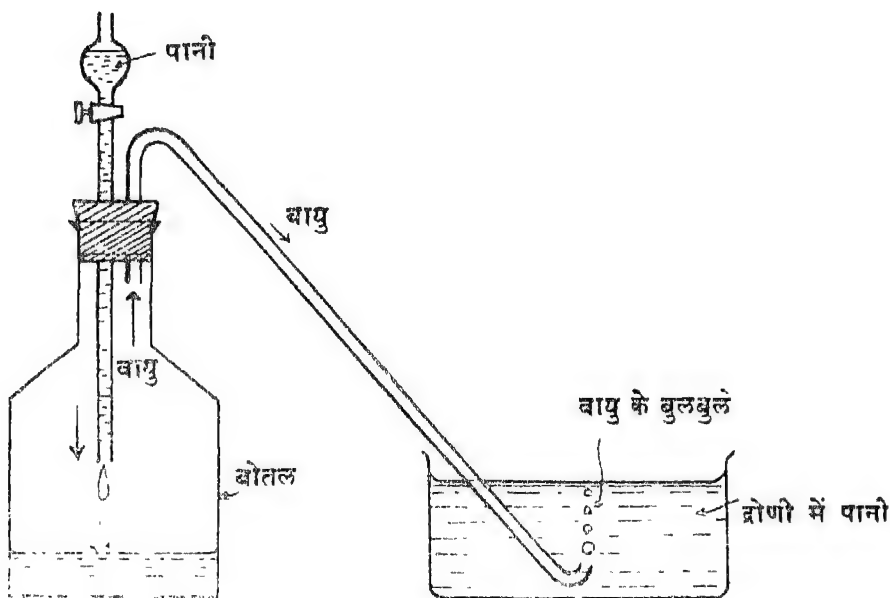
चित्र-1. *वायु संपीडन का प्रतिरोध है*

प्रयोग 2

जैसाकि चित्र-2 म दिखाया गया है, उपकरण को उसी ढग से सजाइए। निकासनली के सिरे को पानी से भरी द्रोणी में डुबाइए। अब टैप-फनल से कुछ पानी गिराइए। आप देखेगे कि पानी में डूबी नली से बुलबुले निकल रहे है। इससे यह प्रकट होता है कि बोतल में वायु थी जिसका स्थान ऊपर से छोड़े हुए पानी ने ले लिया।

प्रयोग 3

मोटे काँच की गोल नली की बोतल लीजिए। उसके मुँह मे रबड़ की डाट लगाइए जिसमें एक काँच की नली फंसी हो (चित्र-3)। इसके ऊपर रबड़ की नली और पिंच-काक लगी हो। आधी बोतल पानी से भरिए (पिंच-काक या दाबक रोधनी) को खोल कर बोतल के पानी को खोलाइए। जब इसमें से भाप



चित्र-2. *वायु स्थान घेरती है (पानी द्वारा विस्थापन)*

निकलने लगे और बोतल के भीतर की वायु का स्थान भाप ले ले तो पिंच-काक को बंद कर दीजिए। अब बोतल को ठंडा होने दीजिए। बोतल के भीतर की भाप संघनित हो जाएगी और वैक्यूम निर्मित हो जाएगा। बंद बोतल को तौल लीजिए। अब पिंच-काक को खोल दीजिए। खोलते ही सूं-सूं जैसी ध्वनि निकलेगी। यह सूँ-सूँ वायु के भीतर जाने के कारण हो रही है। अब फिर से बोतल को तौलिए। आप पाएँगे कि बाद में तौलने पर बोतल पहले से भारी है।

इन परीक्षणों से पता चलता है कि वायु स्थान घेरती है और इसमें भार होता है जैसाकि हर प्रकार के द्रव्य में होता है।

वायु को सर्व प्रथम सन 1654 में ओटोवान गेरिक ने तौला था। पहले उसने एक खोखले गोल को प्रकृत रूप में तौला और फिर पंप से उसकी सारी हवा निकाल कर तौला। इस प्रकार उसने वायु के भार का मोटा-सा अनुमान लगाया।

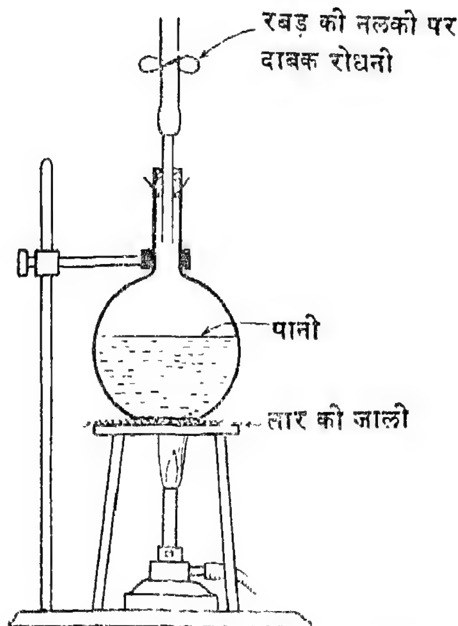
सामान्य स्थितियों में एक लीटर वायु का भार लगभग 1.293 ग्राम होता है।

1.2 वायु एक महत्वपूर्ण रासायनिक पदार्थ है

वायु के बिना जीवन संभव नहीं। मनुष्य और पशु सभी को साँस लेने के लिए इसकी आवश्यकता है। बढ़ने के लिए पौधों को भी वायु चाहिए। जलने के लिए भी वायु अनिवार्य है। यह सब कुछ परीक्षण के तौर पर पहली बार सन 1660 में राबर्ट बायल ने कई प्रकार की चीजें निर्वातित वाहिका में रखकर प्रदर्शित किया था।

1.3 वायु एक मिश्रण है

अठारहवीं शताब्दी के मध्य तक भारतवासी और संसार के अधिकांश लोग वायु को पाँच तत्वों में से एक तत्व मानते थे। अन्य तत्व पृथ्वी, जल, अग्नि और आकाश (ईथर) थे। उनका विचार था कि इन पाँचों तत्वों के भिन्न-भिन्न मात्रा में मिलने से संसार के सब प्रकार के पदार्थ बनते है। धीरे-धीरे यह प्रकट हुआ कि वायु सरल पदार्थ नही है। सन 1757 में एक स्काटिश रसायनज्ञ जोसफ ब्लैक ने यह देखा कि वायु का बहुत थोड़ा-सा अंश क्षार की सहायता से निकाला जा सकता है। उसने इस वायु को 'फिक्स्ड एयर' का नाम दिया। इसका कारण यह था कि यह तब बनती थी जबकि चूने के पत्थर जैसे किसी खनिज को गर्म किया जाए। यह बहुत कुछ उस गैस की तरह थी जो साँस के साथ बाहर निकलती है या ईंधन के जलने मे निकलती है। अब इस गैस को कार्बन डाइऑक्साइड कहा जाता है। सामान्य वायु में कार्बन डाइआक्साइड रहती है। इसे निम्नलिखित प्रयोग द्वारा प्रदर्शित किया जा सकता है।



चित्र-3 वायु में भार होता है और दाब डालती है

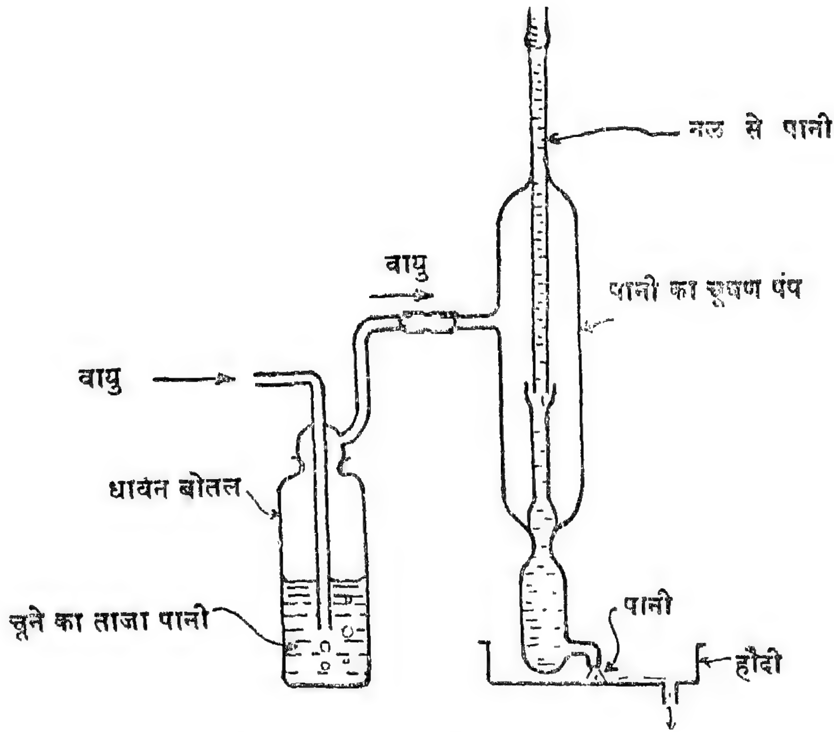
प्रयोग 4

गैस धोने की एक बोतल में थोड़ा-सा चूने का पानी लीजिए। इसका एक सिरा छानने (फिल्टर) के पंप से जुड़ा हो और एक वायु के लिए खुला हो, जैसा चित्र-4 में दिखाया गया है। पंप को चला दीजिए। थोडी देर मे दिखाई देगा कि चूने का पानी दूधिया होने लगा है। यह वायु मे मिली हुई कार्बन डाइआक्साइड के चूसे जाने के कारण चूने के पानी पर उसकी अभिक्रिया के कारण हुआ।

सन 1770–1777 के बीच बहुत-से वैज्ञानिको ने यह सिद्ध किया कि वायु के मुख्यत: दो अंश होते हैं। एक वह जिससे जलने मे सहायता मिलती है और दूसरा वह जिससे ऐसा नहीं होता। सन 1770 में कार्ल विलहेम शील ने यह देखा कि लोहे की भीगी हुई रेतनों के संपर्क में रखने से बंद वायु की मात्रा में कुछ कमी हो जाती है।

प्रयोग 5

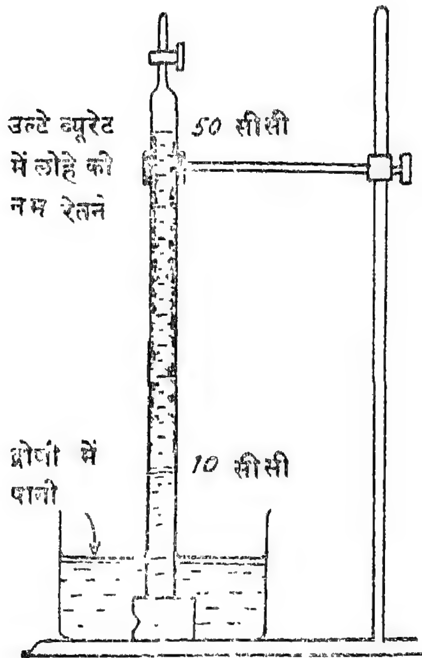
एक ऐसे ब्यूरेट को लेकर जिसके भीतर की तरफ कुछ गीली लोहे की रेतनें चिपकी हो, पानी की द्रोणी मे छेददार आसन पर उलट कर चित्र-5 की तरह लगाइए। पानी का स्तर शून्य के निशान पर रखिए। ब्यूरेट की स्टाप-काक या रोधनी को बंद करके उपकरण को कई दिन तक ऐसा ही रखे रहने दीजिए। आप देखेंगे कि लोहे की रेतनों पर जंग लगने लगी है और पानी ब्यूरेट में ऊपर चढ़ता जा रहा है और शून्य के निशान से ब्यूरेट के पैमाने पर पाँचवें भाग तक चढ़ गया है। जब पानी ब्यूरेट में ऊपर चढ़ना बंद हो जाए



चित्र-4. *वायु में कार्बन डाइआक्साइड रहती है*

तो ब्यूरेट की बची हुई वायु की परीक्षा कीजिए। इसके लिए ब्यूरेट को पानी से निकाल कर जलती हुई लकड़ी की चिपटी ब्यूरेट में डालिए। आप देखेंगे कि लकड़ी बुझ जाएगी। इससे यह ज्ञात होता है कि बची हुई गैस जलने में सहायता नहीं करती और जिससे यह प्रकट होता है कि वायु में (i) वह क्रियाशील गैस होती है जो जंग लगने से सोख ली जाती है (वायु का लगभग पाँचवाँ भाग) और (ii) बची हुई अक्रिय गैस (जो वायु का 4/5 भाग होती है)।

शील ने सोखी जाने वाली वायु को *अग्नि वायु* (फायर एयर) और शेष वायु को *दुर्वायु* (फाउल एयर) नाम दिया क्योंकि अग्नि वायु से जलने में सहायता मिलती है और लोहे को जंग लग जाता है और दुर्वायु से ऐसा नही होता। सन 1772 में जोसेफ प्रिस्टले ने पता लगाया कि वायु का लगभग 20 प्रतिशत सक्रिय होता है। यद्यपि इन सब परीक्षणों से यही प्रकट होता था कि वायु दो से अधिक द्रव्यों का मिश्रण है किन्तु इनमें से किसी भी वैज्ञानिक ने ऐसा कहने का साहस नहीं किया। आखिर सन 1777 में एनताइन लाभोजियर ने ही यह घोषणा की कि वायु एक मिश्रण है। उसने बहुत उच्च कोटि का परीक्षण किया जिससे निश्चित रूप से यह सिद्ध हो गया कि वायु के दो अंश है; जिनके गुण बहुत ही भिन्न या कहिए विरोधी होते है। एक अंश तो लगभग 20 प्रतिशत (आयतन के अनुसार) होता है और जलने

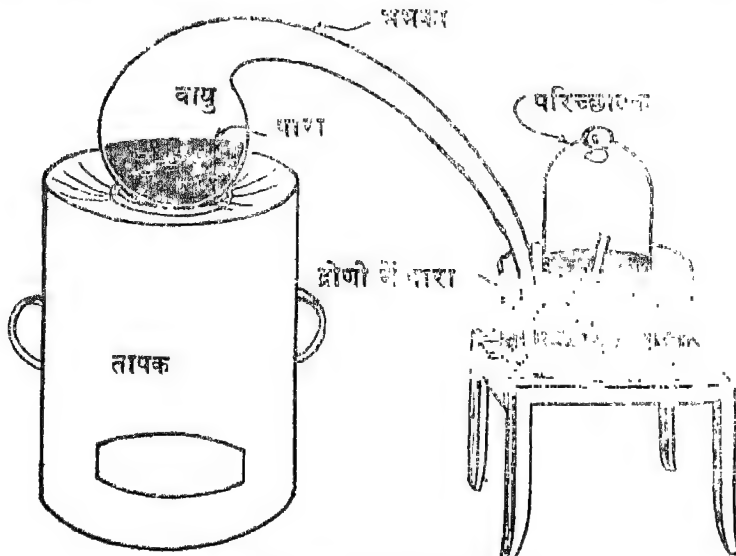


चित्र-5. *वायु से लोहे में जंग लगती है*

में मदद करता है। उसे उसने *ऑक्सीजन* का नाम दिया और दूसरे भाग को जो जलने में सहायक नहीं होता *नाइट्रोजन* कहा। उसने निम्नलिखित प्रयोग किया।

उसने काँच के एक रिटार्ट या भभके में तुला हुआ पारा लिया और भभके को एक ऐसे बेलजार से जोड़ दिया जो एक पारे से भरी द्रोणी (ट्रफ) में उल्टाकर रखा गया था जैसे कि चित्र-6 में दिखाया गया है। उसने पारे को खूब गर्म किया और तब तक गर्म करता रहा जब तक कि वायु के आयतन का घटना रुक नहीं गया और उसने यह देखा कि वायु में उसके पाँचवें भाग के बराबर कमी हुई है। शेष वायु में लौ बुझ गई और पशु (चुहिया) दम घुटने से मर गया।

उसने सारा लाल ठोस पदार्थ (मरक्यूरिक ऑक्साइड) निकाल कर एक दूसरे उपकरण में ले लिया और उसे फिर तब तक गर्म किया जब तक गैस निकलनी बंद नहीं हो गई। इस गैस को भी



चित्र-6. *लाभोजियर का चिरसम्मत प्रयोग*

उसको अलग कर लिया। ऐसा करने पर उसने देखा कि पारे का भार उतना ही हो गया है, जितना आरंभ में था और निकली हुई गैस भी कुल वायु के पाँचवें भाग के बराबर ही थी। यह गैस ऑक्सीजन थी और जब इसे शेष वायु में मिला दिया गया तो फिर वह सामान्य वायु बन गई।

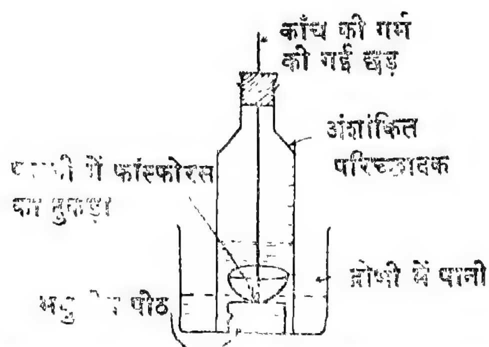
सामान्य वायु में ऑक्सीजन होती है, इसको दिखाने के लिए एक और परीक्षण नीचे दिया जा रहा है।

प्रयोग 6

सफेद फॉस्फोरस का एक टुकड़ा छोटे-से प्याले में लीजिए और ऐसे छतेदार आसन पर रखिए जो एक द्रोणी में थोड़े-से पानी में डूबा हुआ हो। इस प्याले को जैसा कि चित्र में दिखाया गया है एक जार से ढक दीजिए जिसके डाट में शीशे की एक छड़ फँसी हो। पानी के ऊपर जार का जितना भाग है उसको पाँच भागों में बाँट कर काँच पर लिखने वाली पेंसिल या कागज चिपका कर निशान बना दीजिए। अब काँच की छड़ को गर्म करके उससे फॉस्फोरस के टुकड़े को छूकर डाट को तुरंत बंद कर दीजिए। आप देखेंगे कि फॉस्फोरस में आग लग जाएगी और पहले तो जार सफेद घने धुएँ से भर जाएगा, फिर शीघ्र ही यह धुआँ पानी में घुल जाएगा। इससे पानी ऊपर उठेगा और पहले निशान तक पहुँच जाएगा। अब जार में जलता हुआ कागज डालिए। आप देखेंगे कि यह फौरन बुझ जाता है। इससे यह पता चलता है कि वायु में 20 प्रतिशत ऑक्सीजन है और जिसकी फॉस्फोरस के साथ अभिक्रिया होती है तथा बची हुई वायु जलने में सहायता नहीं करती।

नोट: फॉस्फोरस की मात्रा इतनी अवश्य होनी चाहिए कि वह सारी ऑक्सीजन से संयोजित हो सके।

बहुत समय तक यह समझा जाता रहा कि ऑक्सीजन और कार्बन डाइऑक्साइड के अतिरिक्त जो वायु बची रहती है वह शुद्ध नाइट्रोजन होती है। केवल सन 1894 में आकर विलियम रेमसे ने यह पता लगाया कि इसमें पाँच और गैसें होती हैं जो नाइट्रोजन से भी कहीं अधिक अक्रिय होती हैं। उसने उन्हें उत्कृष्ट *गैसों या रेयर गैसों या इनर्ट* अर्थात् *अक्रिय गैसों* की संज्ञा दी। इन गैसों के नाम हैं; हीलियम, नियोन, आरगन, क्रिप्टान और जीनान, और ये सब मिल कर सामान्य वायु के एक प्रतिशत के बराबर होती हैं। इन सबमें आरगन सबसे अधिक मात्रा में होती है। आजकल इन सब गैसों को विशेष विधियों द्वारा अलग-अलग कर लिया जाता है।



चित्र–7. जब फॉस्फोरस बंद वायु में जलता है तो पानी बेलजार में ऊपर उठता है

1.4 वायु का संगठन

इन गैसों के अलावा वायु में पानी की वाष्प भी होती है, जिसको निम्नलिखित प्रयोग द्वारा दिखाया जा सकता है।

प्रयोग 7 (क)

एक वाच-ग्लास में थोड़ा-सा संलीन कैल्सियम

क्लोराइड लीजिए। इसे करीब एक घंटे तक हवा में खुला रखिए। आप देखेंगे कि संलीन कैल्सियम क्लोराइड वायु में से नमी सोखने के कारण नम हो जाता है।

प्रयोग (ख)

एक परखनली लेकर उसमें बर्फ के टुकड़े भर दीजिए और कुछ देर तक रखे रहिए। आप देखेंगे कि वायुमंडल की वाष्प के संघनन के कारण परखनली के बाहर पानी की बूँदें बनने लगी हैं।

वायु के सभी अंशों में से ऑक्सीजन, नाइट्रोजन और उत्कृष्ट गैसें तो हर जगह अधिकतर एक समान रहती हैं किन्तु कार्बन डाइआक्साइड और जल वाष्प की मात्रा बदलती रहती है। स्थिर अंशों का प्रतिशत इस प्रकार रहता है।

	आयतन का प्रतिशत	भार का प्रति-शत
नाइट्रोजन	78·09	75·52
ऑक्सीजन	20·94	23·14
उत्कृष्ट गैसों सहित अन्य घटक	0·97	1·34
	100·00	100·00

वायु के परिवर्तनशील घटकों में से कार्बन डाइ-आक्साइड आयतन के अनुसार 0·03 प्रतिशत अंश होता है और यह काफी महत्वपूर्ण होता है। प्रकृति में ईंधनों के जलने, पौधों और प्राणियों के साँस छोड़ने के कारण यह वायुमंडल में मिली रहती है। खुले स्थानों की अपेक्षा घने उद्योग प्रधान नगरों के वायुमंडल में कार्बन डाइआक्साइड की मात्रा कुछ अधिक रहती है।

एक और परिवर्तनशील घटक होता है जलवाष्प। यह लगभग एक प्रतिशत के बराबर होता है और स्थानीय परिस्थितियों तथा तापमान के अनुसार उसकी मात्रा बदलती है। यह कोहरे, ओस और वर्षा के रूप में प्रकट होता है। गर्म जलवायु में जलवाष्प का प्रतिशत ठंडे जलवायु की अपेक्षा अधिक रहता है। वर्षा ऋतु में यह बहुत अधिक रहता है।

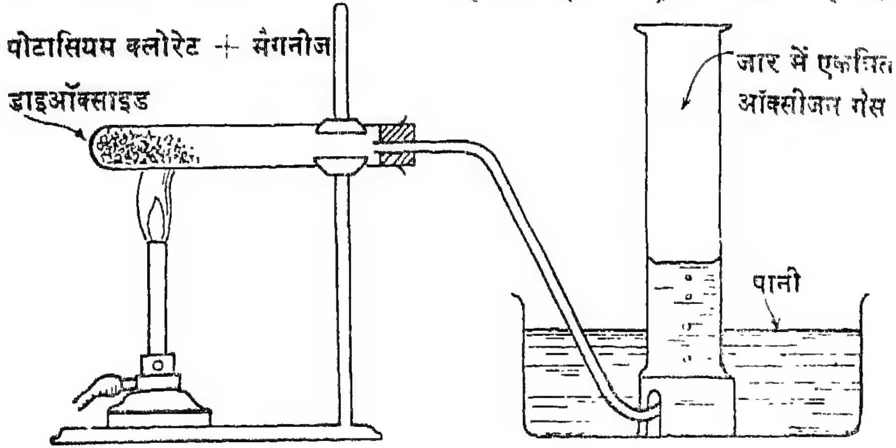
उपर्युक्त घटकों के अतिरिक्त वायु में कभी-कभी कुछ और प्रकार के अपद्रव्य भी रहते हैं। ये अपद्रव्य होते हैं; हाइड्रोजन सल्फाइड, अमोनिया और सल्फर डाइआक्साइड जैसी गैसें। किन्तु ये अपद्रव्य बहुत थोड़ी मात्रा में होते हैं और विशेष रूप से औद्योगिक नगरों की वायु में पाए जाते हैं।

1.5 वायु के महत्वपूर्ण घटक

(क) *ऑक्सीजन* : इसे इस कारण मूलतत्व माना जाता है क्योंकि इसे आगे और सरल द्रव्यों में विभक्त नहीं किया जा सकता। यह रंगहीन और निर्गंध गैस होती है और वायु से तनिक भारी होती है। हर गैस का प्रति इकाई आयतन (एक लिटर) एक निश्चित संहति होती है और वह 0 डिग्री सें० और 760 मिलिमीटर दाब पर ली जाती है। इसे गैस का घनत्व कहते हैं। एक लिटर ऑक्सीजन का 0 डिग्री सें० तापमान और 760 मिलिमीटर दबाव पर भार 1·43 ग्राम होता है और इस प्रकार यही इसका घनत्व कहलाता है। यह जल में कुछ-कुछ घुलनशील है। यह पाइरोगैलोल के घोल में बहुत शीघ्र सोख ली जाती है जिसमें सोडियम हाइड्राआक्साइड होता है। ऑक्सीजन को वायु में से अलग किया जा सकता है।

ऑक्सीजन काफी अभिक्रियाशील होती है और बहुत-से पदार्थों से संयोजन कर सकती है। जलने और साँस लेने में यह सहायक होती है, इसके कारण यह बहुत उपयोगी है। ऑक्सीजन के भरे हुए इस्पात के सिलिंडर अस्पतालों में कृत्रिम स्वास देने के लिए काम आते हैं। इनमें बहुत अधिक दाब पर ऑक्सीजन भरी होती है।

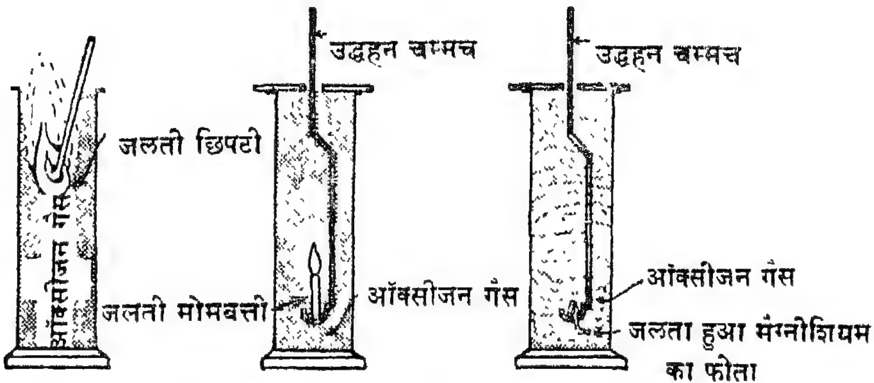
कारखानों में भी ऑक्सीजन के सिलिंडर से ज्वाला प्राप्त करके धातुओं के ढालने का काम लिया जाता है। प्रकृति में ऑक्सीजन एक और महत्व-पूर्ण कार्य करती है। यह मृत पदार्थ के सड़ने में सहायता करती है जिससे कार्बन डाइऑक्साइड, पानी और नाइट्रोजन निकलते हैं।



चित्र–8. प्रयोगशाला में ऑक्सीजन का बनाना

यद्यपि ऑक्सीजन सामान्यतः गैस होती है किन्तु इसे ठंडा करके और दाब डाल कर द्रव रूप में बदला जा सकता है। जब यह द्रव रूप में होती है तो इसे द्रव ऑक्सीजन कहते हैं।

बड़े पैमाने अथवा व्यवसायिक निर्माण में ऑक्सीजन द्रव वायु से बनाई जाती है। वायु को शुद्ध करके, ठंडा करने और संपीडन से द्रव वायु बनती है। जब इसे हल्के-हल्के वाष्पन कराया जाता है तो पहले नाइट्रोजन अलग हो जाती है और ऑक्सीजन पीछे बच रहती है। प्रयोगशाला में पोटासियम क्लोरेट को थोड़े से मैंगनीज डाइ-ऑक्साइड के साथ मिलाकर आगे बताए गए प्रयोग के



चित्र–9. ऑक्सीजन में जलती छिपटी

चित्र–10. ऑक्सीजन में जलती मोमबत्ती

चित्र–11. ऑक्सीजन में जलता हुआ मैग्नीशियम का फीता

अनुसार करने से ऑक्सीजन तैयार की जा सकती है। यहाँ पोटासियम क्लोरेट के विघटन में सहायता करने के लिए मैंगनीज डाइऑक्साइड का उपयोग किया जाता है। ऐसे पदार्थ को जो अभिक्रिया को तीव्र कर देता है, उत्प्रेरक कहते हैं।

प्रयोग 8 प्रयोगशाला में ऑक्सीजन का बनाना

थोड़े-से पोटासियम क्लोरेट के क्रिस्टल लेकर उन्हें थोड़े मैंगनीज डाइऑक्साइड के साथ मिला लीजिए। इस मिश्रण को कठोर कांच की एक ऐसी परखनली में लीजिए, जिसकी डाट में से एक नली निकल कर पानी की द्रोणी में डूबी हुई हो। परखनली को गर्म कीजिए और गैस को इस ढंग से भरिए कि पानी की जगह गैस लेती जाए। इस जार को चित्र-8 की भांति छत्तेदार आसन पर रखना चाहिए। गैस के निम्नलिखित गुणों को नोट कीजिए :

(i) गैस के एक जार में जलती हुई लकड़ी की खपची डाल कर देखिए। आप देखेंगे कि खपची और अधिक चमक के साथ जलती है (चित्र-9)।

(ii) दूसरे जार में जलती हुई मोमबत्ती उतारिए और आप देखेंगे कि मोमबत्ती की लौ और तेजी से जलेगी (चित्र-10)।

(ख) *नाइट्रोजन* : ऑक्सीजन की तरह नाइट्रोजन भी एक मूलतत्व है। यह भी वर्णहीन है और इसमें भी कोई गंध नहीं होती। यह वायु से कुछ हल्की होती है। यह पानी में बहुत कठिनाई से और बहुत थोड़ी घुलती है। बहुत अधिक दाब पड़ने पर यह तरल रूप में बदल जाती है जिसका कोई रंग नहीं होता है और बर्फ के समान यह ठोस रूप में बदल जाती है। यह अपेक्षाकृत निष्क्रिय होती है और इस कारण न यह जलने में सहायता करती है और न सामान्य स्थितियों में अन्य पदार्थों में संयोजन करती है। हाँ, बहुत ऊँचे तापमान पर यह दूसरे पदार्थों से अभिक्रिया करती है। उदाहरण के लिए यह हाइड्रोजन और मैग्नीशियम जैसी धातुओं से संयोजन करती है। यद्यपि नाइट्रोजन विषैली नहीं होती किन्तु ऑक्सीजन के न रहने के कारण प्राणी मर जाते हैं। वास्तव में यह ऑक्सीजन के लिए वातावरण में तनुकारी का काम करती है। यह गैस बिजली के बल्बों में भरने के काम आती है और प्रयोगशाला या उद्योगों में यह अक्रिय वायुमंडल का काम देती है। औद्योगिक रूप में भी यह कई महत्वपूर्ण रसायन जैसे अमोनिया और नाइट्रिक एसिड जैसे महत्वपूर्ण रसायन बनाने के काम आती है।

औद्योगिक निर्माण के लिए नाइट्रोजन तो द्रव वायु से प्राप्त की जाती है, किन्तु प्रयोगशाला में यह नीचे लिखे प्रयोग के अनुसार अमोनियम क्लोराइड और सोडियम नाइट्राइट के घोल को गर्म करने से प्राप्त की जा सकती है।

प्रयोग 9. प्रयोगशाला में नाइट्रोजन का बनाना

सोडियम नाइट्राइट और अमोनियम क्लोराइड के सांद्र घोल तैयार कीजिए। दोनों को बराबर-बराबर आयतन में लेकर गोल तली के फ्लास्क में लेकर चित्र-12 की तरह सारे उपकरण को फिट कीजिए। फ्लास्क को हल्की आग से गर्म कीजिए और जारों में पानी के नीचे की तरफ विस्थापन की विधि से पानी के ऊपर गैस जमा कीजिए। नीचे लिखे गुणों की ओर ध्यान दीजिए :

(i) गैस में न कोई वर्ण है और न कोई गंध।

(ii) एक उद्दहन चम्मच में रखकर जलती हुई एक मोमबत्ती गैस वाले जार में पहुँचाइए। आप देखेंगे कि मोमबत्ती फौरन बुझ जाएगी।

(iii) गैस भरे एक अन्य जार में मैग्नीशियम का जलता हुआ फीता डालिए। आप देखेंगे कि गैस मैग्नीशियम से मिल कर एक सफेद पदार्थ उत्पन्न करती है, जिसे *मैग्नीशियम नाइट्राइड* कहते हैं।

(ग) उत्कृष्ट गैसे: ये भी मूलतत्व होते है और इनके प्रमुख गुण है, इनकी अक्रियता। ये नाइट्रोजन से अधिक अक्रिय होती हैं और सामान्यत: रासायनिक अभिक्रियाओं मे भाग नहीं लेतीं। ये सब गैमे भी वर्णहीन और निर्गंध होती हैं।

इन सब गैसों में सबसे अधिक दिलचस्प हीलियम होती है। हाइड्रोजन को छोड़कर यह सब गैसों में सबसे हल्की होती है। यह वायु से लगभग सात गुनी हल्की होती है और पर्यवेक्षण के काम आने वाले गुब्बारों में भरी जाती है। इस काम के लिए इसे हाइड्रोजन से अधिकता दी जाती है क्योंकि हाइड्रोजन ज्वलनशील है जबकि हीलियम नही जलती। ऑक्सीजन के साथ मिलाकर गोताखोर साँस लेने के लिए हीलियम का इस्तेमाल करते है। हीलियम बहुत नीचे तापमान पर खौलती है और इसके कारण यह बहुत नीचे तापमान उत्पन्न करने के काम आती है। अन्य उत्कृष्ट गैसें विसर्जन नलिकाओं के भरने के काम आती है और ये रंग-बिरंगे प्रकाश पैदा करती हैं। उदाहरण के लिए शहरों में विज्ञापन के लिए जो नियोन साईन बनते है, वे इन्ही गैसों के होते है।

1.6 मिश्रण

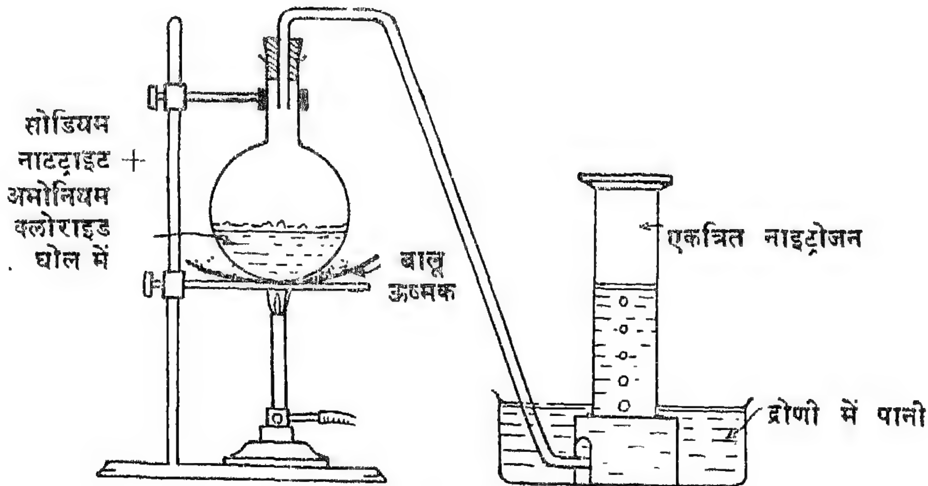
इस प्रकार हमने देखा कि वायु गैसों का मिश्रण है, जो अधिकांश मूलतत्व होती हैं। वायु को द्रवित करके प्रभाज वाष्पन द्वारा इन गैसों को पृथक किया जा सकता है। प्रकृति में ठोस पदार्थों और द्रवों तथा गैसों के मिश्रण बहुत मिलते है। कुछ मिश्रण बहुत जटिल और कुछ साधारण होते है। कुछ सरलतर ठोस मिश्रण ये है:

(i) लोहे की रेतन और रेत,
(ii) रेत और गंधक,
(iii) रेत और नमक,
(iv) बारूद।

इनको सरल यांत्रिक तरीकों से अलग-अलग किया जा सकता है, जैसाकि नीचे वर्णन किया गया है।

प्रयोग 10

रेत और नमक के मिश्रण को एक बीकर में लेकर और कुछ अधिक पानी डाल कर हिलाइए।



चित्र–12. *प्रयोगशाला में नाइट्रोजन का बनाना*

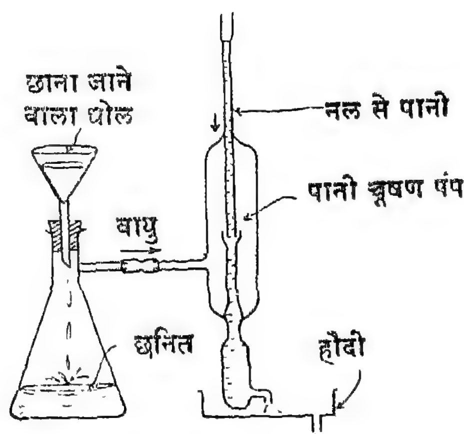
पानी को काँच की छड़ से अच्छी तरह चलाइए और चित्र 13-(क) या 13-(ख) की भाँति इसे छान लीजिए। आप देखेंगे कि रेत बीकर में या फिल्टर पेपर के ऊपर अवशेष की तरह रह जाता है और नमक के घोल के साथ निकल जाता है और छने हुए द्रव की तरह जमा हो जाता है। इस छने हुए द्रव को एक चीनी के प्याले में लेकर चित्र-14 (क) या चित्र-14 (ख) की भाँति इसका वाष्पन कीजिए। अब इसमें से नमक अवशेष रह जाएगा।

घुल कर छन जाएगा। इस छने हुए द्रव (निस्यंद) को कूंडी में गर्म पानी के ऊष्मक पर रख कर इसका वाष्पन कीजिए या इसमें हवा फूँक कर इसका वाष्पन कीजिए। कार्बन डाइसल्फाइड का वाष्पन हो जाएगा और गंधक बचा रहेगा।

सावधानी : कार्बन डाइसल्फाइड ज्वलनशील द्रव है और इसे आग के पास नहीं ले जाना चाहिए।



चित्र–13 (क) *सामान्य छनाई*



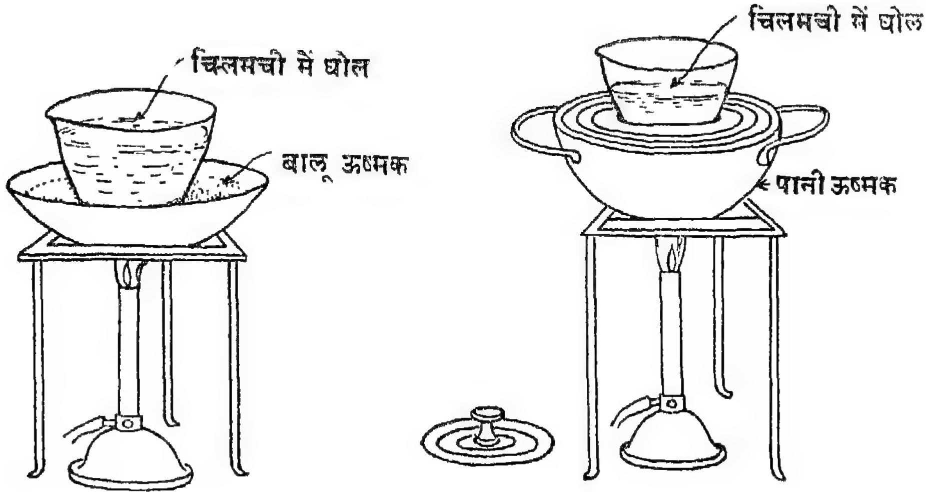
चित्र–13 (ख) *चूषण द्वारा छनाई*

प्रयोग 11. रेत और गंधक के मिश्रण को अलग करना

गंधक, कार्बन डाइसल्फाइड में घुल जाता है और रेत नहीं घुलता। अतः दोनों के मिश्रण को एक बीकर में लेकर कार्बन डाइसल्फाइड के साथ अच्छी तरह हिलाइए। अच्छी तरह हिलाकर जैसाकि ऊपर बताया गया है इसे छान लीजिए। आप पाएँगे कि रेत अवशिष्ट रह जाएगा और गंधक

प्रयोग 12. लोहे की रेतन और रेत के मिश्रण को अलग करना

लोहे के रेतनों को चुंबक आकर्षित करता है किन्तु रेत को नहीं। इस तरह दोनों को चुंबक की सहायता से अलग-अलग किया जा सकता है। एक चुंबक लेकर इसे मिश्रण की पतली-सी परत के ऊपर इधर-उधर घुमाइए। आप देखेंगे कि लोहे की रेतनें चुंबक से चिपक जाएँगी और रेत बच



चित्र 14 (क) रेत के ऊष्मक पर वाष्पन

चित्र 14 (ख) जल ऊष्मक पर वाष्पन

रहेगा । इस प्रकार चुंबक पर से लोहे की रेतनां को हटा कर जमा किया जा सकता है।

आगे चल कर मिश्रणों को अलग-अलग करने की अन्य विधियों का भी उल्लेख होगा, जहाँ कि विशेष प्रकार के मिश्रणों जैसे कि घोलों की चर्चा की जाएगी।

संक्षेप

जो कोई भी वस्तु स्थान घरती है और जिसमें भार है, वह *द्रव्य* है ।

वायु द्रव्य है ।

ऑक्सीजन और नाइट्रोजन वायु के मुख्य घटक है ।

ऑक्सीजन जलने में सहायक है और नाइट्रोजन नहीं ।

वायु में कार्बन डाइआक्साइड और जलवाष्प होते हैं ।

वायु में कुछ उपयोगी अक्रिय गैसें होती हैं जैसे कि *हीलियम*, *नियोन* और *आरगन* ।

मूलतत्व वह पदार्थ है जिसका आगे और सरल द्रव्यों में विभाजन नहीं किया जा सकता । ऑक्सीजन और नाइट्रोजन मूलतत्व हैं और इसी प्रकार उत्कृष्ट गैसें भी मूलतत्व हैं।

मिश्रण में एक से अधिक पदार्थ होते है जिनका निश्चित अनुपात में रहना आवश्यक नहीं और इनके गुण न्यूनाधिक रूप में अलग-अलग अवयवों के जैसे होते हैं।

वायु गैसों का मिश्रण है । प्रकृति में ठोस पदार्थों, द्रवों और गैसों के मिश्रण बहुत मिलते हैं ।

ठोस मिश्रण के अवयवों को सरल यांत्रिक क्रियाओ द्वारा जैसे कि घोलने, छानने या वाष्पन द्वारा अलग-अलग किया जा सकता है ।

दोहराने के लिए प्रश्न

1. आप कैसे दिखाएँगे कि 'वायु एक द्रव्य है' ?
2. ऐसे दो प्रयोग बताइए जिनसे यह दिखाया जा सके कि वायु कम-से-कम दो गैसों का मिश्रण है।
3. एक ऐसा प्रयोग बताइए जिससे दिखाया जा सके कि वायु में कार्बन डाइऑक्साइड होती है।
4. आप वायु में जलवाष्प की अवस्थिति कैसे दिखाएँगे ?
5. वायु में उत्कृष्ट (अक्रिय) गैसों की अवस्थिति कैसे दिखाई जा सकती है ? कुछ के नाम बताइए।
6. यदि वायु में ऑक्सीजन के अलावा और कोई गैस न हो तो क्या होगा ?
7. वायु में से ऑक्सीजन और नाइट्रोजन को पृथक करने का एक प्रयोग बताइए।
8. क्या आप दिखा सकते हैं कि जीवन के लिए वायु अनिवार्य है ?
9. वायु के प्रमुख अवयवों या घटकों के नाम बताइए।
10. गाँव और उद्योगों वाले नगर की वायु में क्या अंतर होता है ?
11. आप कैसे तैयार करेंगे :
    (i) प्रयोगशाला में ऑक्सीजन ?
    (ii) प्रयोगशाला में नाइट्रोजन ?

अध्याय 2

जल

2.1 प्राकृतिक जल

जल हमारे लिए सबसे अधिक परिचित तथा परम अनिवार्य पदार्थों में है। पृथ्वी की लगभग तीन-चौथाई सतह पानी से ढकी है। हम इसे वर्षा, नदियों, झीलों, कुओं, चश्मों, समुद्रों और महासागरों के जल के रूप में देखते हैं। जीवन के लिए पानी का कितना महत्व है, इसका इसी बात पर निर्णय किया जा सकता है कि मनुष्य शरीर का दो-तिहाई भाग पानी का ही बना है।

पानी वर्णहीन द्रव है जो पीने और धोने के काम आता है। इसके अलावा भी इसके अन्य बहुत-से उपयोग हैं। बायलरों में पानी से भाप बनती है जिससे इंजिन चलते हैं। पानी को जमा करके बर्फ बनाई जाती है जिसका घरों को ठंडा करने में और प्रयोगशालाओं और उद्योगों में व्यापक रूप से उपयोग किया जाता है। रसायनज्ञ के लिए पानी का विशेष महत्व है क्योंकि पानी में बहुत प्रकार के पदार्थ घुल जाते हैं।

प्रयोग 1

एक बीकर में पानी लेकर उसमें नमक या चीनी डालिए। काँच की छड़ से इसे हिलाइए। आप देखेंगे नमक या चीनी जल्दी से घुल जाती है।

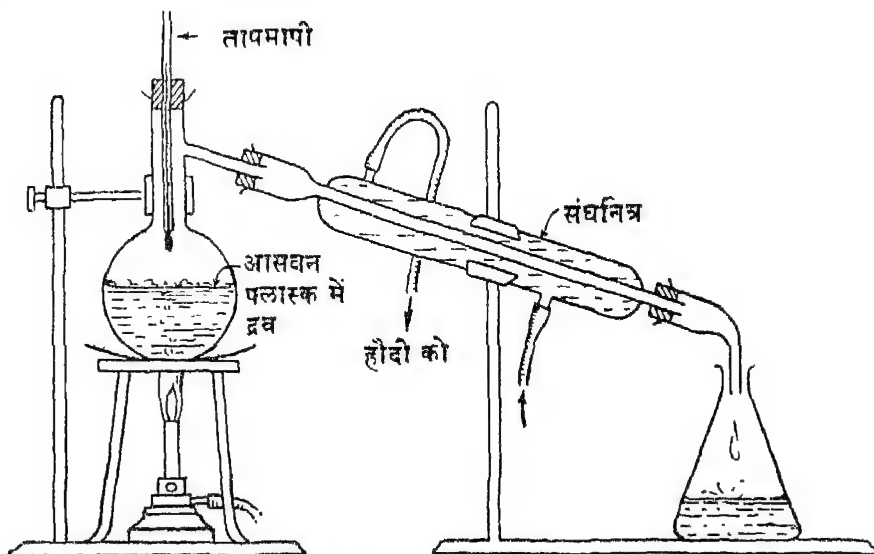
2.2 प्राकृतिक जल की अशुद्धताएँ

प्राकृतिक स्रोतों में जो पानी मिलता है उसमें कुछ अशुद्धताएँ घुली होती हैं और कुछ निलंबित होती हैं। इसमें रोग पैदा करने वाले जीवाणु या कीटाणु भी रहते हैं। भिन्न-भिन्न प्रकार के प्राकृतिक जल में से वर्षा का जल सबसे शुद्ध होता है। इसमें केवल ऑक्सीजन और कार्बन डाइ-ऑक्साइड जैसी गैसें घुली रहती हैं। अन्य प्रकार के प्राकृतिक जल में लवण घुले रहते हैं *किन्तु कुओं, चश्मों, नदियों और झीलों के पानी* में लवणों का अनुपात प्रायः बहुत थोड़ा होता है। लवणों का अनुपात समुद्र जल में बहुत अधिक, लगभग 3·5 प्रतिशत होता है। इन सबमें सबसे अधिक सामान्य याने खाने का नमक होता है जिसे *सोडियम क्लोराइड* कहते हैं। कभी-कभी चश्मों के पानी में घुले हुए पदार्थों की मात्रा काफी अधिक रहती है, ऐसे पानी को *खनिज जल* (मिनरल वाटर) कहा जाता है।

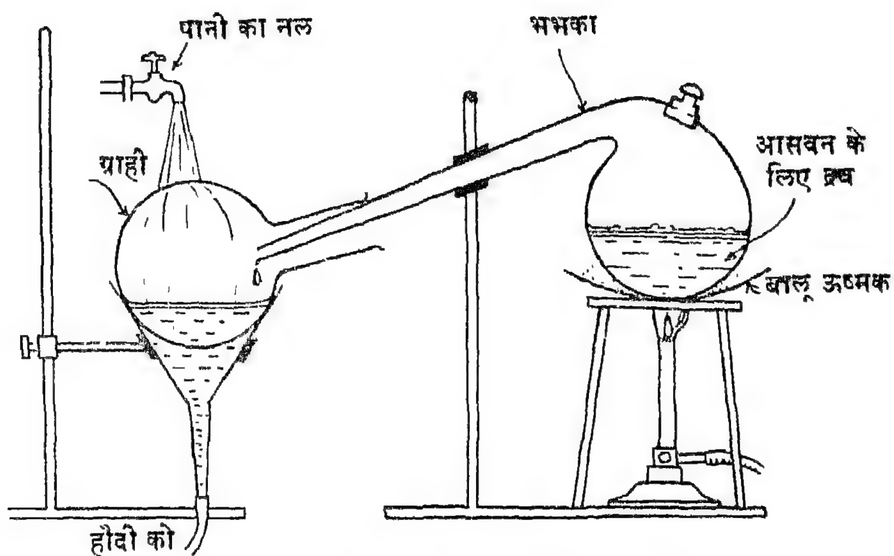
2.3 शुद्ध जल

वैज्ञानिक उपयोगों के लिए पानी हर प्रकार के घुले हुए पदार्थों से मुक्त होना चाहिए। ऐसा

पानी आसवन द्वारा प्राप्त होता है। आसवन का उपयुक्त उपकरण चित्र-15(क) और 15(ख) में दिखाया गया है।



चित्र–15 (क) आसवन फ्लास्क द्वारा आसवन



चित्र–15 (ख) काँच के भपके या रिटार्ट द्वारा आसवन

प्रयोग 2.

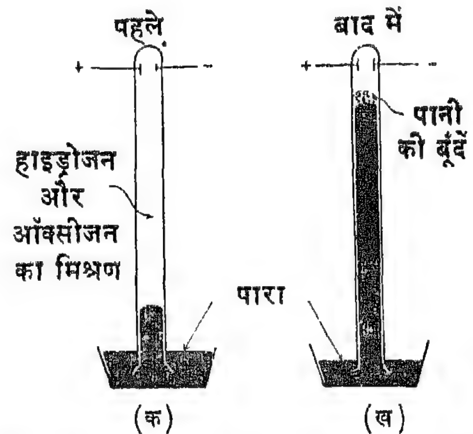
एक आसवन फ्लास्क में थोड़ा-सा पानी लीजिए और जिस ढंग से चित्र-15 (क) में दिखाया गया है एक संघनित्र के जरिए इसे अभिग्राही से जोड़ दीजिए। नल का ठंडा पानी संघनित्र में होकर बहने दीजिए और फ्लास्क को गर्म कीजिए। आप देखेंगे कि फ्लास्क का पानी भाप बन जाता है और संघनित होकर शुद्ध पानी के रूप में अभिग्राही में जमा होता जाता है। पानी में जो ठोस अशुद्धताएँ घुली है वे आसवन फ्लास्क में ही रह जाएँगी। आसवित पानी में थोड़ी-सी कार्बन डाइ-आक्साइड गैस हवा में से घुली रह सकती है।

2.4 पानी एक यौगिक है

वायु की तरह बहुत लंबे समय तक पानी को भी एक तरल पदार्थ समझा जाता रहा और अठारहवीं शताब्दी के अंतिम चरण तक यही विचार व्याप्त रहा। सन 1781–84 के वर्षों में प्रीस्टले केवेन्डिश और लाभोजियर ने यह देखा कि हाइड्रोजन और ऑक्सीजन के संयोजन संबंधी उनके प्रयोगों में पानी भी उत्पन्न हो जाता है। बाद में यह पाया गया कि विद्युत द्वारा पानी को हाइड्रोजन और ऑक्सीजन गैसों में अपघटित किया जा सकता है। इन प्रयोगों से यह पता चला कि पानी मूलतत्त्व नहीं है किन्तु यह मिश्रण भी नहीं है क्योंकि इसके अवयवों को सरल रीति से अलग-अलग नहीं किया जा सकता जैसा कि मिश्रणों को किया जा सकता है। पानी को इसके अवयवों के रूप में अपघटित करने के लिए जटिल विधियों का सहारा लेना पड़ता है। इसके अतिरिक्त भार के अनुसार ये अवयव एक निश्चित अनुपात में ही संयोजित होते हैं। एक ग्राम हाइड्रोजन आठ ग्राम ऑक्सीजन से मिलकर नौ ग्राम पानी बनाती है।

प्रयोग 3. पानी उत्पन्न करने के लिए हाइड्रोजन और ऑक्सीजन का संयोजन

जैसा कि चित्र-16 में दिखाया गया है एक द्रोणी में पारे के ऊपर एक गैस आयतनमापी नली में मापित आयतन में हाइड्रोजन और ऑक्सीजन लीजिए। ऑक्सीजन गैस काफी अधिक मात्रा में लीजिए। काँच की नलकी में प्लेटिनम के तार पहुंचा कर चिनगारी पैदा करके दोनों गैसों के मिश्रण में विस्फोट कीजिए। विस्फोट के बाद

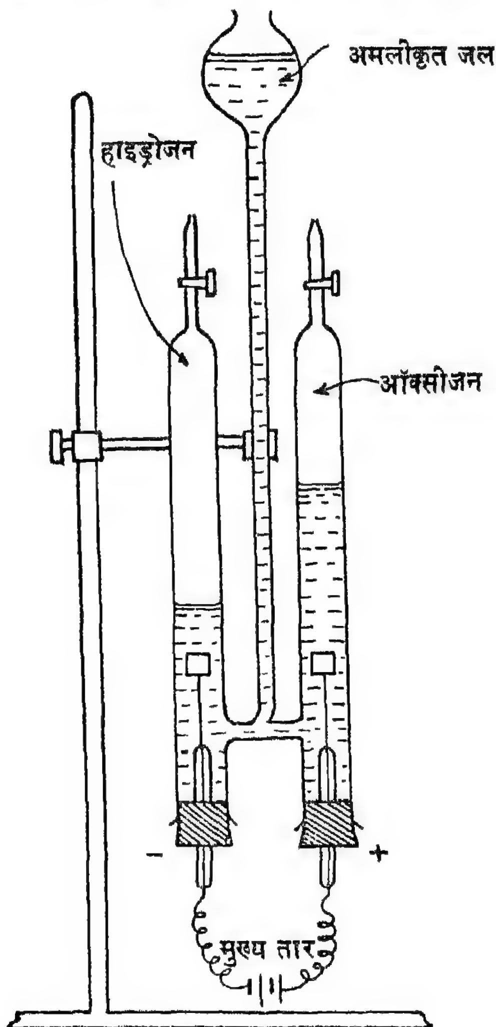


चित्र-16. *ऑक्सीजन और हाइड्रोजन के विस्फोट द्वारा भाप और पानी उत्पन्न करना। (क) पहले (ख) बाद में।*

नलकी को ठंडा कीजिए। जो फाजिल गैस बच रही है, द्रोणी में और अधिक पारा डालकर दाब को समायोजित करके, फाजिल गैस के आयतन को नोट कीजिए। आप देखेंगे कि दो हिस्से हाइड्रोजन एक हिस्से ऑक्सीजन के साथ मिलती है, जिससे पानी उत्पन्न होता है और जो नलकी में पारे के तल के ऊपर संघनित हो जाएगा।

प्रयोग 4. बिजली के प्रवाह द्वारा पानी का अपघटन

जैसा कि चित्र-17 में दिखाया गया है ऐसे पानी में से विद्युत प्रवाह गुजारिए जिसमें थोड़ा-सा अम्ल (एसिड) मिला हो। यह काम वोल्टा-मीटर में होना चाहिए। आप देखेंगे कि वोल्टामीटर की दोनों भुजाओं में दो गैसें अलग-अलग एकत्र हो जाती हैं और आप पाएँगे कि दोनों के आयतन का अनुपात हमेशा ही 1:2 रहता है। आप यह भी देखेंगे कि उस गैस में जिसका आयतन एक भाग है, दीप्त लकड़ी डालने से गैस उसे और जलाएगी, जिससे यह स्पष्ट हो जाता है कि यह गैस ऑक्सीजन है। इसके विपरीत जो गैस दुगुने आयतन में है वह तब जलती है जब उसे जलाया जाता है और इस प्रकार यह हाइड्रोजन ही है। इससे यह प्रकट होता है कि पानी, ऑक्सीजन और हाइड्रोजन का रासायनिक यौगिक है और ये दोनों गैसें, आयतन के अनुसार 1:2 के अनुपात में संयोजित हैं।



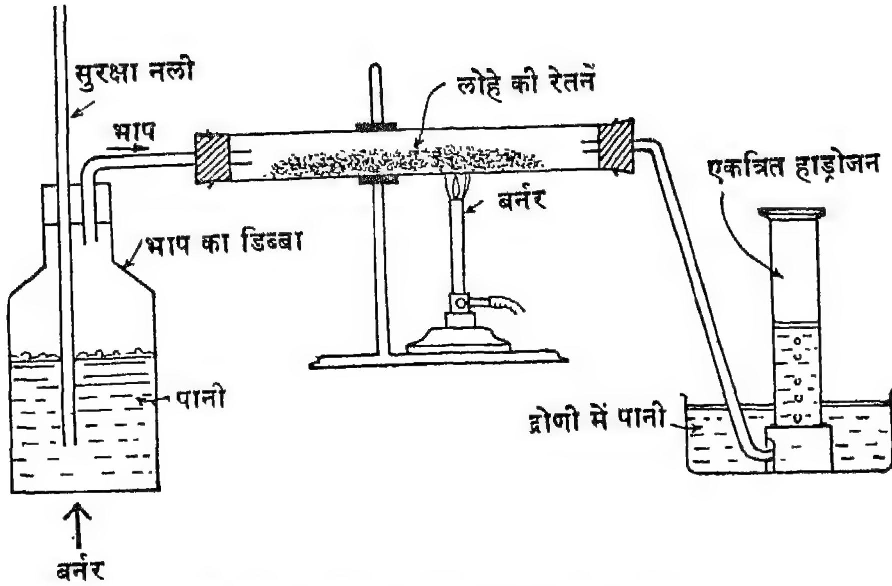
चित्र-17. *विद्युत धारा द्वारा पानी का अवघटन*

प्रयोग 5. लोहे की गर्म रेतनों द्वारा पानी का अपघटन

जिस प्रकार चित्र-18 में दिखाया गया है, उस प्रकार उपकरण को जमाइए। बड़े डिब्बे में पानी के गर्म होने से जो भाप उत्पन्न होगी उसे गर्म रेतनों के ऊपर से गुजारिए और इस प्रकार जो गैस निकले उसे पानी की द्रोणी में उल्टाए हुए काँच के जार में जमा कीजिए। आप देखेंगे कि यह हाइड्रोजन की भाँति व्यवहार करती है। लोहे के ऑक्सीजन से मिलने से एक यौगिक बनता है। भाप में से निकली हुई ऑक्सीजन लोहे के साथ मिलकर मैग्नेटिक ऑक्साइड नाम का यौगिक बनाती है। इस प्रयोग में भाप में से लोहे द्वारा ऑक्सीजन निकाल ली जाती है और हाइड्रोजन बच रहती है।

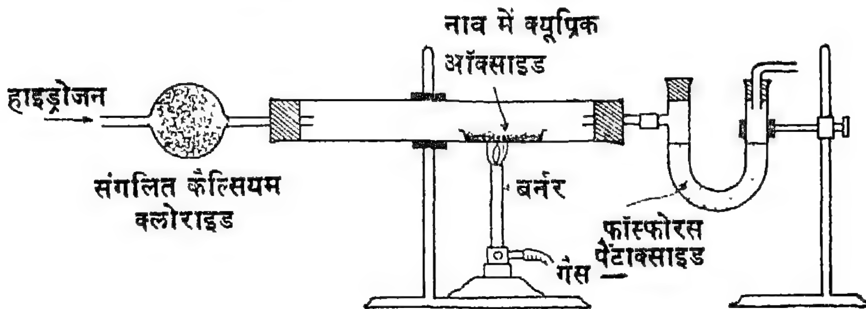
प्रयोग 6. भार के अनुसार पानी का संघटन

चित्र-19 की तरह उपकरण को जमाइए। ठीक एक ग्राम शुद्ध काला कॉपर ऑक्साइड (क्यूप्रिक ऑक्साइड) एक चीनी की नाव जैसी प्याली में लेकर उसे दहननली में रखिए। इसे गर्म कीजिए और साथ में इसके ऊपर से शुद्ध और



चित्र-18. *गर्म लोहे की रेतनों द्वारा पानी का अपघटन*

सूखी हाइड्रोजन की धारा गुजारिए। ऐसा करने पर क्यूप्रिक ऑक्साइड अपनी ऑक्सीजन छोड़ देगा जो हाइड्रोजन से मिलकर पानी बन जाएगी और तुली हुई U की शक्ल की नलकी में फॉस्फोरस पैंटाऑक्साइड या संलीन कैल्सियम क्लोराइट इस पानी को सोख लेगा। जब क्यूप्रिक ऑक्साइड अधिकांश ताँबा (कॉपर) में बदल जाए तो प्याली को तौलिए। आप देखेंगे कि अब भार में जो कमी हुई है वह उसी ऑक्सीजन के भार के कारण हुई है जो हाइड्रोजन से मिल चुकी है। प्रयोग के बाद U-नली को तौल लीजिए। इसके भार में जो वृद्धि हुई है वह उत्पन्न हुए पानी के भार के बराबर है। पानी और ऑक्सीजन के भारों का जो अंतर है उससे हाइड्रोजन के भार का पता चल जाएगा जो ऑक्सीजन से मिली है।



चित्र-19. *भार के अनुसार पानी का संघटन*

प्रेक्षण और परिकलन :

प्याली का भार+ऑक्साइड (प्रयोग से पहले)	...6·45 ग्राम
प्याली का भार+अवशेष (प्रयोग के पश्चात)	...6 05 ग्राम
ऑक्सीजन का भार	...6·45=6·05
	... 0·40 ग्राम
U-नली का भार (प्रयोग से पहले)	...20·56 ग्राम
U-नली का भार (प्रयोग के पश्चात)	...21·01 ग्राम
उत्पन्न हुए जल का भार	...0 45 ग्राम
और संयुक्त हाइड्रोजन का भार	...0·45 – 0·40 =0 05 ग्राम

0·45 ग्राम पानी में 0 40 ग्राम ऑक्सीजन और 0·05 ग्राम हाइड्रोजन रहती है या कि 9 ग्राम पानी में 8 ग्राम ऑक्सीजन और एक ग्राम हाइड्रोजन रहती है।

अंत में यह भी जान लेना चाहिए कि पानी के गुण हाइड्रोजन और ऑक्सीजन दोनों से बिल्कुल भिन्न होते हैं और यह दोनों ही मूलतत्व हैं। इस प्रकार पानी एक विशेष प्रकार का *यौगिक* है। यौगिक उस पदार्थ को कहते हैं जिसमें निम्नलिखित लक्षण मिलते हैं :

(i) यह संभागी होता है।

(ii) इसके अवयव निश्चित समानुपात में ही संयुक्त होते हैं।

(iii) इसके अवयव आसानी से अलग नहीं किए जा सकते।

(iv) इसके गुण अपने अवयवों के गुणों से भिन्न होते हैं।

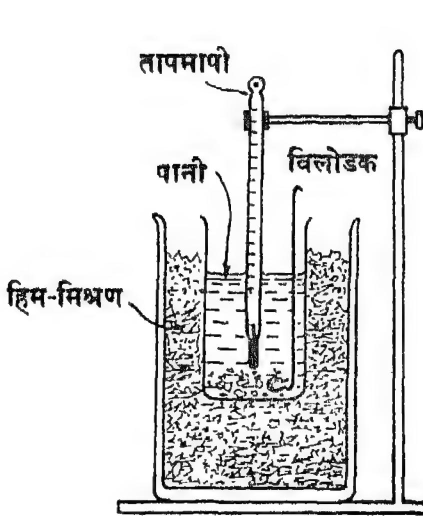
2.5 पानी के गुण

शुद्ध पानी रंगहीन पारदर्शी द्रव है जिसमे कोई स्वाद या गंध नहीं होती। पानी की मोटी परतें हरियाली लिए हुए हल्के नीले रंग की दिखाई पड़ती हैं। *पानी का हिमांक* स्थिर होता है और यह एक वायुमंडल में 0 डिग्री सेंटीग्रेड माना जाता है। एक वायुमंडल दाब में पानी का खौलने का बिंदु क्वथनांक 100 डिग्री सेंटीग्रेड है। एक घन सेंटीमीटर पानी का द्रव्यमान 4 डिग्री सेंटीग्रेट के तापमान पर एक ग्राम होता है और उसे घनत्व भी कहते है। ऊष्मा की इकाई एक कैलॉरी होती है और इससे 1 ग्राम पानी का तापमान 1 डिग्री सेंटीग्रेड बढ़ जाता है। इस प्रकार हमने देखा कि द्रव्यमान और ऊष्मा के मापने के लिए जल के गुणों के कारण मानक स्थापित हो गए हैं।

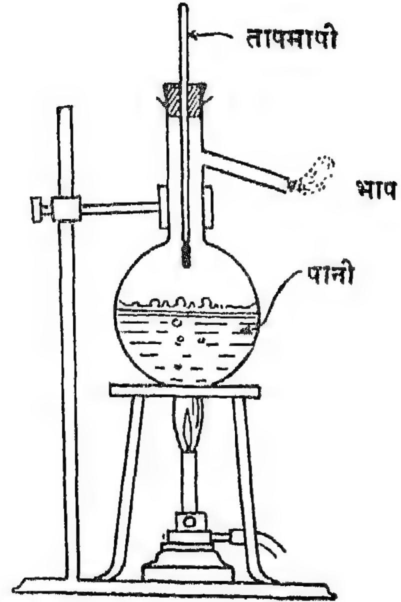
यहाँ द्रवों के एक सामान्य गुण पर जोर दिया जा सकता है। हर शुद्ध द्रव के जमने का और खौलने का एक निश्चित बिंदु होता है और हर द्रव का एक निश्चित घनत्व होता है।

प्रयोग 7. पानी के हिमांक का पता लगाना

एक बीकर लेकर उसे पानी से आधा भर लीजिए। जैसाकि चित्र-20 में दिखाया गया है, पानी मे थोड़ा डूबता हुआ एक तापमापी लगाइए और जो ताप हो उसे नोट कर लीजिए। अब बीकर को नमक और बर्फ के मिश्रण में एक दूसरे बर्तन में दाब दीजिए और पानी को हिलाते रहिए। आप देखेंगे कि जब तक पानी जमने नही लगता तब तक तापमान बराबर गिरता जा रहा है। अब इस तापमान को भी नोट कर लीजिए। यही 0 डिग्री सेंटीग्रेड या पानी के जमने का बिंदु या हिमांक है।



चित्र-20. *पानी के हिमांक का पता लगाना*



चित्र-21. *पानी के क्वथनांक का पता लगाना*

प्रयोग 8. पानी के क्वथनांक का पता लगाना

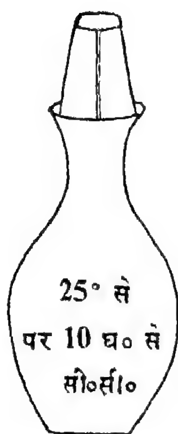
थोड़ा-सा पानी और कुछ झांबा पत्थर लेकर फ्लास्क को इस ढंग से बंद कीजिए कि इसकी डाट में से एक थर्मामीटर लगाया गया हो। चित्र-21 की तरह फ्लास्क को जमा कर रखिए। जब तक कि पानी खौलने न लगे तब तक उसे गर्म करते जाइए। उस समय का तापमान नोट कर लीजिए जब यह पानी में डूबा हुआ हो और तब का भी जबकि यह पानी के ऊपर हो और पानी खौल रहा हो। यह तापमान 100 डिग्री सेंटीग्रेड होता है और यह पानी खौलने का बिंदु है। यदि फ्लास्क में शुद्ध पानी नहीं लिया गया है तो तापमापी को खौलते पानी में डुबाना नहीं चाहिए क्योंकि तब यह और ऊँचा तापमान भी अभिलेख कर सकता है।

प्रयोग 9. पानी के घनत्व का पता लगाना

एक ऐसी घनत्व बोतल लीजिए जिस पर 10 घन सेंटीमीटर पर निशान लगा हो और इस बोतल को तौल लीजिए। जहाँ तक निशान लगा है वहाँ तक इसमें शुद्ध पानी भरिए। अब इसे बाहर से साफ करके तौल लीजिए। अब निम्न प्रकार से भारों का तौल कर लीजिए और इस क्रम से भार लिखते जाइए :

खाली बोतल का भार	···	30 ग्राम
बोतल का भार+पानी	···	40 ग्राम
पानी का भार	···	40—30 = 10 ग्राम
बोतल का आयतन	···	10 घन सेंटीमीटर
प्रति घन सेंटीमीटर पानी का द्रव्यमान	···	10/10 = 1 ग्राम

बस यही पानी का घनत्व है।



चित्र-22. *पानी के घनत्व का पता लगाना*

ऊष्मा के लिए पानी आश्चर्यजनक रूप से स्थिर रहता है। यह 1000 डिग्री सेंटीग्रेड के ऊपर जाकर ही अपघटित होने लगता है। यदि पानी शुद्ध होगा तो उसमें साबुन के झाग खूब उठेंगे। ऐसे पानी को *कोमल* कहते हैं। जिस पानी में कुछ और पदार्थ घुले हों, उस अशुद्ध पानी को *कठोर* कहते हैं। कठोर पानी में साबुन के झाग नहीं उठेंगे। बहुत अधिक मात्रा में साबुन घुलने और अत्यधिक मात्रा में रहने और काफी हिलाए जाने से ही साबुन के झाग पैदा होते हैं। पानी में जो कठोरता होती है वह कैल्सियम और मैग्नीशियम के लवणों के रहने के कारण ही होती है। विशेष विधियों द्वारा पानी की कठोरता को दूर किया जा सकता है। इन विधियों के बारे में पुस्तक के दूसरे भाग में विचार किया गया है।

2.6 हाइड्रोजन गैस

सत्रहवीं शताब्दी में वान हैलमोंट ने पहली बार हाइड्रोजन गैस इकट्ठी की, किन्तु बहुत आगे चलकर हेनरी केवेन्डिश ने सन 1766 में हाइड्रोजन गैस के बारे में अध्ययन किया। दोनों ने जस्त, लोहे और रांगे जैसी धातुओं पर तनु गंधक के तेजाब या *हाइड्रोक्लोरिक* एसिड की अभिक्रिया द्वारा ही हाइड्रोजन गैस तैयार की। आज भी प्रयोगशाला में सामान्यतः इसी विधि से हाइड्रोजन तैयार होती है।

प्रयोग 10. प्रयोगशाला में हाइड्रोजन बनाना

एक वुल्फ बोतल लेकर इसे चित्र-23 की तरह फिट कीजिए। इसके एक मुंह में थिसिल-कीप लगाइए और दूसरे मुंह में एक निकास नलकी लगाकर उसे पानी की द्रोणी में डुबा दीजिए। वुल्फ बोतल में जस्त के कुछ रवे रखिए। थिसिल-कीप में से इतना ही पानी छोड़िए जिससे जस्त के टुकड़े ढक जाएँ और थिसिल-कीप का सिरा डूब जाए। अब थिसिल-कीप में सांद्रित गंधक के तेजाब को छोड़िए। आप देखेंगे कि बोतल में बुदबुदाहट होगी जो गैस बनने के कारण है। हवा को निकल जाने दीजिए और फिर जैसा कि चित्र-23 में दिखाया गया है पानी के विस्थापन द्वारा जारों में गैस इकट्ठी कीजिए।

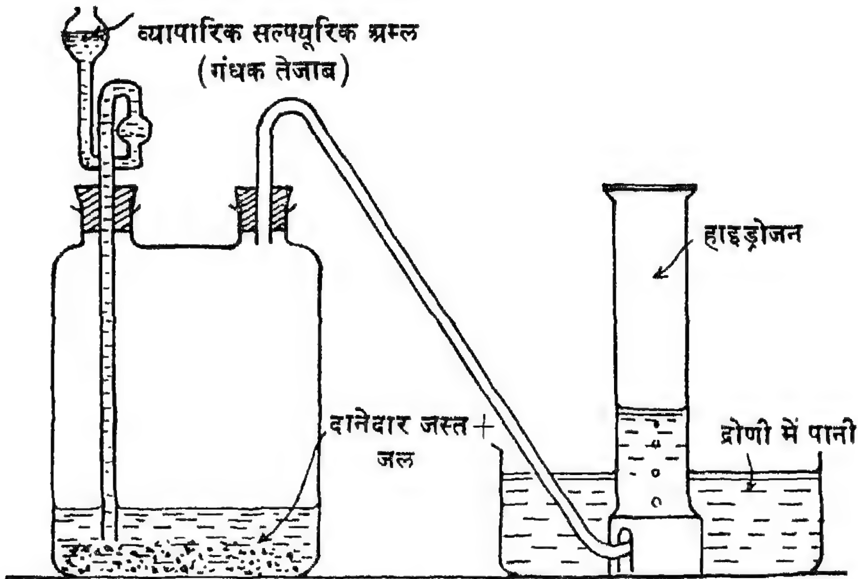
> *सावधानी :* हाइड्रोजन के हवा से मिलने से विस्फोटक मिश्रण बनता है।

इसलिए जारों में हाइड्रोजन गैस जमा करने से पहले परखनली में गैस की परीक्षा कर लीजिए। यदि गैस शुद्ध होगी तो शांति से जलेगी और यदि इसके साथ वायु घुली-मिली होगी तो विस्फोट होगा।

हाइड्रोजन के निम्नलिखित गुणों को नोट कीजिए :

(i) यह गंधहीन और रंगहीन गैस है।

(ii) इसका घनत्व अर्थात प्रति लिटर संहति 0·09



चित्र-23. *प्रयोगशाला में हाइड्रोजन का बनाना*

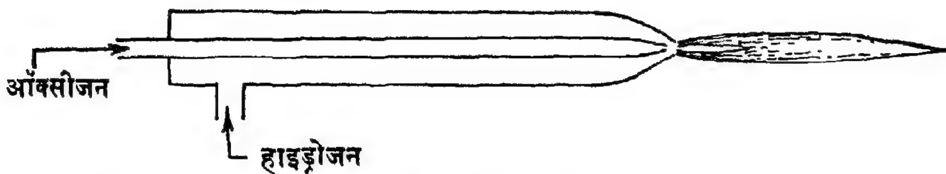
ग्राम है। यह सबसे हल्की गैस होती है और इसी कारण इसे गुब्बारों में भरा जाता है।

(iii) यह पानी में बहुत कम घुलती है किन्तु निकल, पैलेडियम और प्लेटिनम जैसी धातुएँ इसकी काफी मात्रा को सोख लेती हैं।

(iv) यह बहुत ही ज्वलनशील है। इसी कारण प्रकृति में यह शुद्ध रूप में नहीं पाई जाती।

(v) यह बिजली की चिनगारी या किसी ज्योति के ज्वलन से ऑक्सीजन से संयोजन करती है और इसमें जोर का धमाका होता है। जब इसे बहुत-सी ऑक्सीजन की उपस्थिति में सावधानी से एक विशेष बर्नर में जलाया जाता है, जैसा कि चित्र-24 में दिखाया गया है तो इससे बहुत ऊष्म ज्वाला उत्पन्न होती है जिसे *आक्सीहाइड्रोजन फ्लैम* कहते हैं जो झालने और धातुओं के पिघलाने के काम आती है।

(vi) हाइड्रोजन गैस धातुओं के ऑक्साइडों में से ऑक्सीजन को अलग कर देती है और उन्हें शुद्ध धातु के रूप में छोड़ती है। इस प्रकार यह अपचायक है।



चित्र-24. *झालने के काम आने वाली ऑक्सीहाइड्रोजन ज्वाला (फ्लेम) का उत्पादन*

संक्षेप

पानी एक रासायनिक यौगिक है जो हाइड्रोजन और ऑक्सीजन गैसों से बनता है और यह दोनों गैसें स्वत: मूलतत्व हैं। रासायनिक यौगिक की परिभाषा यह है कि यह दो या अधिक तत्वों के संयोजन से बना हुआ एक संभागी पदार्थ है, जिसमें सब तत्व एक निश्चित अनुपात में संयुक्त होते हैं और इसके गुण अपने अवयवों के गुणों से भिन्न होते हैं।

पानी में बहुत-से पदार्थ घुल जाते हैं और इसलिए इसमें घोलने की महान शक्ति है।

शुद्ध पानी में साबुन के झाग बहुत जल्दी उठ आते हैं और ऐसे पानी को *कोमल पानी* कहते हैं। *कठोर पानी* में साबुन के झाग बहुत जल्दी नहीं उठते बल्कि एक गाढ़ा-सा अवक्षेप बन जाता है।

प्राकृतिक पानी अशुद्ध होता है और शुद्ध करके इसे पीने योग्य बनाया जाता है।

दोहराने के लिए प्रश्न

1. आप क्यों कहते हैं कि पानी एक द्रव है ?
2. यह सिद्ध करने के लिए कि पानी ऑक्सीजन और हाइड्रोजन का यौगिक है, एक प्रयोग बताइए ?
3. यह बताइए कि प्रयोगशाला में हाइड्रोजन और ऑक्सीजन कैसे बनाते हैं ?
4. इस कथन का क्या अर्थ है :
   (क) ऑक्सीजन जलने में सहायक होती है।
   (ख) हाइड्रोजन ज्वलनशील है।
5. ऐसा होने पर कौन-सी चीजें बनती हैं :
   (क) हाइड्रोजन के वायु या ऑक्सीजन में जलने पर।
   (ख) ऑक्सीजन में मैग्नीशियम के फीते के जलने पर।
   (ग) लोहे की गर्म रेतनों के ऊपर से भाप के गुजरने पर।
   (घ) गर्म कॉपर ऑक्साइड के ऊपर से हाइड्रोजन के गुजरने पर।
6. क्या यह कहना ठीक है कि जीवन के लिए पानी अनिवार्य है ?
7. बिजली की धारा द्वारा पानी के अपघटन के लिए उसमें थोड़ा-सा तेजाब क्यों डालते हैं।
8. प्राकृतिक पानी क्या है ? उन अशुद्धताओं का नाम लीजिए जो सामान्यत: प्राकृतिक पानी में होती हैं।
9. किस पानी को आप कठोर और किसको कोमल कहेंगे ?
10. आप कैसे सिद्ध करेंगे कि पानी कठोर है ?
11. पीने के लिए प्राकृतिक पानी को शुद्ध करना हमारे लिए क्यों आवश्यक है ?

अध्याय 3

कार्बन, सल्फर और फॉस्फोरस

3.1 कार्बन

पत्थर के कोयले और लकड़ी से हर एक परिचित होता है जोकि जलाने के लिए ईंधन के काम आते हैं। पत्थर का कोयला खानों से निकलता है और लकड़ी जंगलों से मिलती है। जब इन्हें वायु रहित भभके (रिटार्ट) में गर्म किया जाता है तो दोनों अपघटित हो जाते हैं। पत्थर के कोयले के इस प्रकार जलने से कोक बनता है और लकड़ी के जलने से *लकड़ी का कोयला* बनता है। कोक और लकड़ी के कोयले में अधिकांश *कार्बन* होती है।

जब तेल अपूर्ण रूप से जलता है तो इससे महीन कालिख बनती है, जिसे *काजल* या *कार्बन-ब्लैक* कहते हैं। यह प्रायः शुद्ध कार्बन होती है। कोक, लकड़ी का कोयला और काजल कार्बन के रवाहीन रूप हैं और तीनों भिन्न-भिन्न काम आते हैं। लकड़ी का कोयला ईंधन के और धातुओं के शोधने के काम आता है। बारूद बनाने में भी इस कोयले का इस्तेमाल होता है, गैसों और वाष्प सोखने में भी इसका प्रयोग होता है।

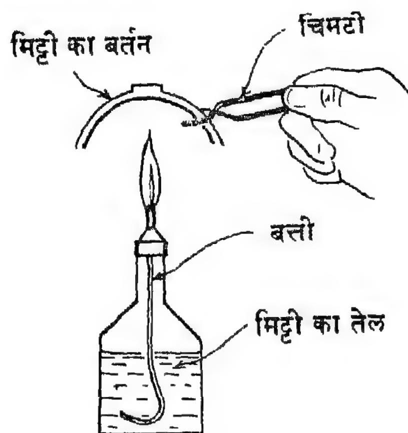
प्रयोग 1.

लोहे की डिब्बी में मिट्टी का तेल लीजिए और उसमें रुई की बत्ती लगाइए। लैंप को जलाकर इसकी लौ के ऊपर चित्र-25 की तरह कोई मिट्टी का बर्तन या शीशे की तश्तरी रखिए। आप देखेंगे कि बर्तन के भीतर की ओर या काँच की प्लेट पर बारीक-बारीक कालिख जम जाएगी। इसी को काजल कहते हैं।

कई धातुओं को उनके प्राकृतिक स्वरूप अर्थात खनिज रूप में से शोधने के लिए कोक का इस्तेमाल किया जाता है। काजल पेंट बनाने में वर्णक की भाँति इस्तेमाल होता है। देसी स्याही और छपाई के काम आने वाली स्याहियों में भी वर्णक के रूप में काजल काम आता है। रबड़ उद्योग में भी यह काम में लाया जाता है।

प्रकृति में कार्बन रवे (क्रिस्टल) के रूप में भी मिलती है। इसके दो रूप *हीरा* और *ग्रेफाइट* हैं जो देखने में एक-दूसरे से बहुत भिन्न होते हैं। शुद्ध हीरा रंगहीन होता है और यह चमकता भी है जबकि ग्रेफाइट गहरे धूसर रंग का होता है। किन्तु दोनों एक ही मूलतत्व कार्बन के बने होते हैं और जब दोनों ऑक्सीजन की उपस्थिति में जलते हैं तो दोनों से ही कार्बन डाइआक्साइड निकलती है। इसके अलावा यह और अधिक सरल पदार्थों में अपघटित नहीं हो सकते। अतः कार्बन एक

मूलतत्व है और यह रवेदार तथा बिना रवे के रूपों में पाई जाती है। इसके भिन्न-भिन्न रूपों के भौतिक गुण तो भिन्न-भिन्न होते हैं किन्तु रासायनिक गुण एक से होते हैं। किसी तत्व के दो या अधिक रूपों में पाए जाने की क्षमता को अपरूपता



चित्र-25. *तेल की डिब्बी की लौ के ऊपर मिट्टी के बर्तन पर कालिख का जमना*

(ऐलाट्रापी) कहते हैं, और भिन्न-भिन्न रूपों को अपररूपी रूपांतरण कहते है। सब रूपों के ऑक्सीजन में जलने पर केवल कार्बन डाइआक्साइड ही बनती है; 12 ग्राम भार की किसी रूप की कार्बन के जलने से वही (44 ग्राम) कार्बन डाइआक्साइड मिलेगी।

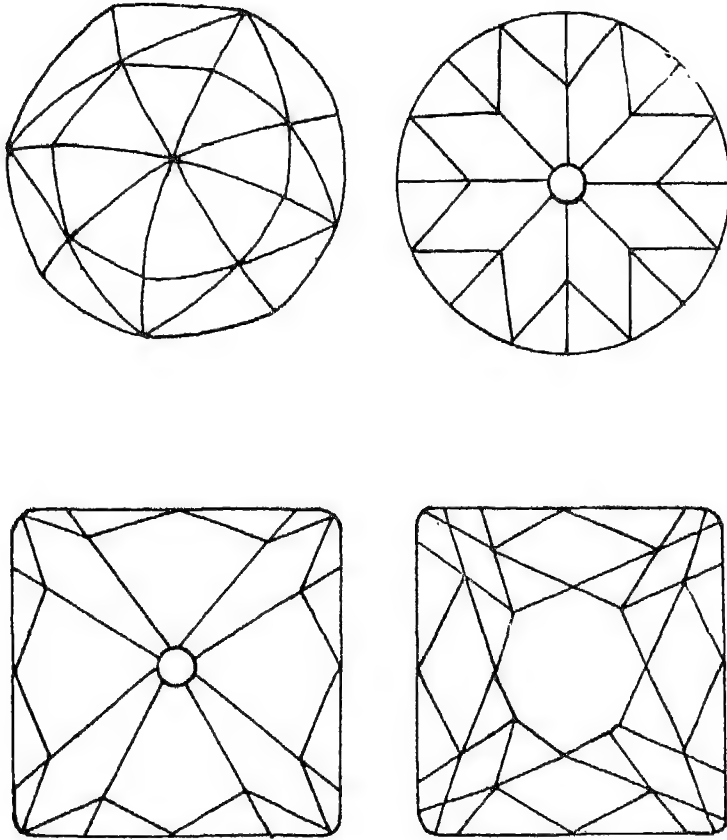
3.2 हीरे

यद्यपि हीरे प्रकृति में मिलते अवश्य हैं किन्तु वे दुर्लभ है और इसी कारण बहुत मूल्यवान होते हैं। यह छोटे-छोटे रवों के रूप में या तो चट्टानों में मिलते है या नदियों और चश्मों की तलहटियों में। इनका भार और आकार भी काफी भिन्न होता है। अब तक प्राप्त सबसे भारी प्राकृतिक हीरे का भार 620 ग्राम है। दक्षिणी अफ्रीका और कांगों में हीरे की बड़ी-बड़ी खानें हैं। रूस में ऊरल पर्वतों में, आस्ट्रेलिया और मध्य भारत में भी हीरे मिलते हैं।

प्राकृतिक हीरों को अभीष्ट शक्ल में काटा और पालिश किया जाता है, इससे अधिक-से-अधिक चमक आती है और प्रकाश का परावर्तन होता है। हीरों को तराश कर आभूषणों में भी जड़ा जाता है। हालैंड में एम्सटर्डम नामक नगर में हीरों का बहुत बड़ा उद्योग है। बहुत सफाई से कटे हुए और पूर्णत: पारदर्शक हीरों को अंग्रेजी में 'ब्रिलिएंट्स' कहते हैं। चित्र-26 में कुछ नमूने दिखाए गए हैं। ये हीरे बहुत मँहगे होते हैं।

कभी कभी हीरे अशुद्धताओं के कारण रंगीन भी होते हैं। ये नीले, हरे, लाल, गुलाबी या पीले रंग के होते हैं। धातुओं के लेशमात्र से हीरे में रंग आ जाता है। बिल्कुल काले रंग के भी हीरे होते हैं। इन्हें कार्बोनेडो कहते हैं और ये सस्ते होते हैं। हीरे क्योंकि सबसे अधिक कठोर पदार्थ है, इस कारण यह अन्य सख्त चीजों को काटने के काम में लाया जाता है। हीरे से काँच को काटा जाता है और शैलों में भी इसी से छेद किया जाता है। आजकल जितना हीरा निकाला जाता है उसमें से 80 प्रतिशत इस काम आता है। कुछ किस्म के हीरे संश्लिष्ट रूप में भी बनते हैं।

हीरा कार्बन का सघनतम रूप है। इसका अपेक्षित घनत्व 3·5 है। ऊष्मा और विद्युत के लिए यह अचालक है। जब इसे वायु की अनुपस्थिति में बहुत गर्म किया जाता है तो यह ग्रेफाइट का रूप ले लेता है। जब हीरे को ऑक्सीजन की उपस्थिति में खूब गर्म किया जाता है तो यह जल जाता है और इससे कार्बन डाइआक्साइड निकलती है।



चित्र-26. *ब्रिलिएंट्स*

3.3 ग्रेफाइट

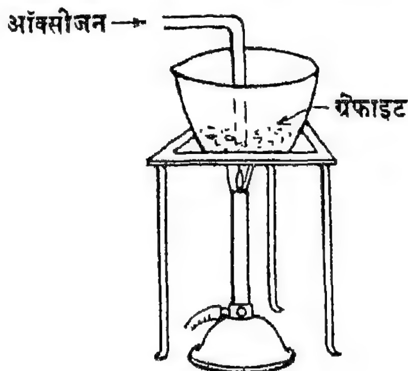
ग्रेफाइट मैक्सिको, कनाडा, मेडागास्कर, कैलिफोर्निया, भारत और लंका की खानों में प्रकृत रूप में मिलता है। यह गहरे धूसर से रंग का पदार्थ है और इसमें कुछ चमक भी होती है। इसका विशिष्ट घनत्व 2·2 है। यह अपारदर्शक होता है और छूने में साबुन जैसा लगता है। कागज पर इससे लकीर खींचने पर इसके सूक्ष्म रवे (क्रिस्टिल) कागज पर रह जाते हैं। शीशे की कही जाने वाली पेंसिलें वास्तव में ग्रेफाइट से ही बनती हैं। ग्रेफाइट वायु में नहीं जलता किन्तु शुद्ध ऑक्सीजन में जल जाता है।

प्रयोग 2.

लोहे के क्रुसिबल या घड़िया में थोड़ा-सा ग्रेफाइट लीजिए और इसे हवा में खूब गर्म कीजिए। आप देखेंगे कि बहुत गर्म करने पर भी ग्रेफाइट नहीं जलेगा। अब ग्रेफाइट वाले क्रुसिबल को चित्र-27 की तरह इस ढंग से गर्म कीजिए कि इसमें ऑक्सी-

जन की धारा बहती रहे। आप देखेंगे कि ग्रेफाइट ऑक्सीजन में जल जाएगा।

ग्रेफाइट हीरे से इस बात में भिन्न है कि यह विद्युत का चालक भी होता है, भले ही मंद चालक हो। इसी कारण कभी-कभी इससे इलैक्ट्रोड्स भी बनाए जाते हैं। बारीक मिट्टी के साथ मिलाकर इससे क्रुसिबल बनाए जाते हैं जो बहुत ऊँचा तापमान सह सकते हैं। तेल के साथ ग्रेफाइट मिलाकर स्नेहक बनाए जाते हैं। स्नेहक वह पदार्थ होता है जो मशीनों की रगड़ दूर करके उन्हें चिकना करने के काम आता है। बहुत उच्च कोटि का ग्रेफाइट हाल में ही परमाणु-भट्टियों में काम आने लगा है। कोक से भी कृत्रिम रूप से ग्रेफाइट तैयार किया जाता है और यह ग्रेफाइट प्राकृतिक ग्रेफाइट से बहुत अधिक शुद्ध और समांग होता है।



चित्र-27. *ग्रेफाइट ऑक्सीजन में जलता है, वायु में नहीं।*

हीरे और ग्रेफाइट की रासायनिक प्रतिक्रियाएँ एक जैसी होती हैं। दोनों ही अम्ल और क्षार के प्रति स्थायी होते हैं और जलने पर दोनों से कार्बन डाइआक्साइड बनती है, जो अम्लीय होती है।

कार्बन अधातु है। लोहे, ताँबे और सोने जैसे धातुओं की तुलना में यह हल्की होती है। यह विद्युत और ऊष्मा की चालक नहीं होती। ग्रेफाइट मंद चालक होता है और हीरा अचालक।

3.4 कार्बन डाइआक्साइड

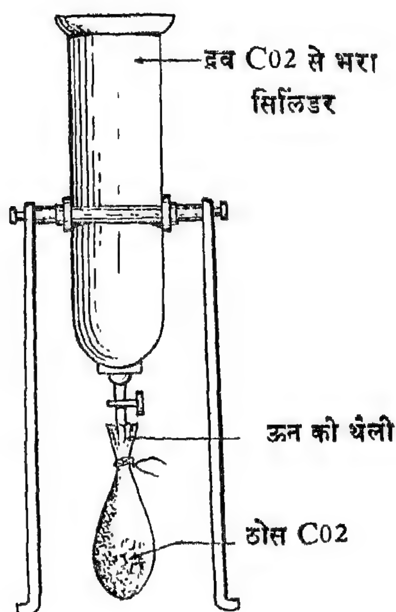
किसी भी रूप में कार्बन के जलने से कार्बन डाइआक्साइड उत्पन्न होती है। जैसाकि पहले बताया जा चुका है, कुछ सीमा तक यह वायु में रहती है। कार्बनिक पदार्थों के जलने और अप-घटित होने तथा प्राणियों के साँस लेने के कारण वायु में कार्बन डाइआक्साइड रहती है।

कार्बन डाइआक्साइड रंगहीन गैस है और इसमें कोई गंध भी नहीं होती। वायु से यह 1·5 गुना भारी होती है। सामान्य परिस्थितियों में 1 लिटर कार्बन डाइआक्साइड का भार 1·98 ग्राम होता है। वह पानी में काफी घुल जाती है और दबाव पड़ने पर और अधिक घुल जाती है। इसका जलीय विलय या घोल *कार्बनिक एसिड* कहलाता है। यह स्वाद में तीखा होता है और सोडा-वाटर की तरह इस्तेमाल किया जाता है। इससे नीला लिटमस लाल हो जाता है। कार्बन डाइआक्साइड गैस को दबाव के अधीन और सामान्य तापमान पर तरल रूप में बदला जा सकता है। द्रव कार्बन डाइआक्साइड इस्पात के सिलिंडरों में भर कर रखी जाती है। ठोस कार्बन डाइआक्साइड भी होती है और इसे सूखी बर्फ (ड्राई आईस) कहते हैं।

प्रयोग-3 कार्बन डाइआक्साइड-हिम या सूखी बर्फ कैसे बनाएं

जैसाकि चित्र-28 में दिखाया गया है तरल कार्बन डाइआक्साइड से इस्पात के सिलिंडर को दाब के अधीन उल्टा कर दीजिए। निकासी वाल्व के ऊपर एक छोटा-सा ऊन का काला थैला बाँध दीजिए। वाल्व को कुछ सेकंड के लिए खोलिए ताकि द्रव थैले में तेजी से बह कर आने लगे। आप देखेंगे कि थैले के भीतर की ओर सूखी बर्फ जम जाएगी।

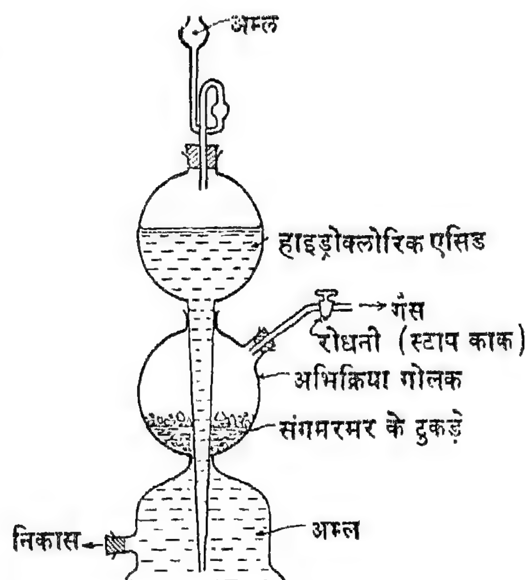
कार्बन डाइआक्साइड बहुत उपयोगी होती है। यह जलने में असहायक होती है और आग बुझा देती है। इसी कारण आग बुझाने के काम आती है। आग बुझाने के यंत्रों में कार्बन डाइआक्साइड ही भरी जाती है। औद्योगिक रूप मे यह कपड़े धोने का सोडा बनाने के काम आती है और चीनी उद्योग तथा पेय पदार्थों में वातन के काम भी आती है। सूखी बर्फ का जल्दी खराब होने वाली वस्तुओं को सुरक्षित रखने में प्रयोग किया जाता है। आइसक्रीम के तैयार करने और भर कर रखने तथा उन कामों में भी इसका उपयोग किया जाता है, जिनके लिए नीचे तापमान की आवश्यकता होती है। प्रकृति में कार्बन डाइआक्साइड का बहुत महत्वपूर्ण स्थान है। सूर्य के प्रकाश और क्लोरोफिल नामक हरे वर्णक की उपस्थिति में पौधों में यह ग्लूकोज और माड़ी के रूप में बदल जाती है।



चित्र 28 सूखी बर्फ का बनाना

औद्योगिक अर्थात बड़े पैमाने पर कार्बन डाइ-आक्साइड चूना बनाने में चूने के पत्थर के जलने से या शर्कराओं अथवा माड़ी के किण्वन होकर अल्कोहल बनने के समय उद्योत्पादन के रूप में प्राप्त होती है।

प्रयोगशाला में इसे प्रायः संगमरमर के टुकड़ों पर वूल्फ बोतल में हाइड्रोक्लोरिक एसिड की अभिक्रिया से तैयार किया जाता है, जैसाकि चित्र-32 (क) में दिखाया गया है। किप के उपकरण में कार्बन डाइआक्साइड भी बनाई जाती है जिसमें से जब और जैसे चाहो गैस बराबर मिलती रहती है। किप का उपकरण चित्र-29 में दिखाया गया है।



चित्र-29. कार्बन डाइआक्साइड की सप्लाई के लिए किप का उपकरण

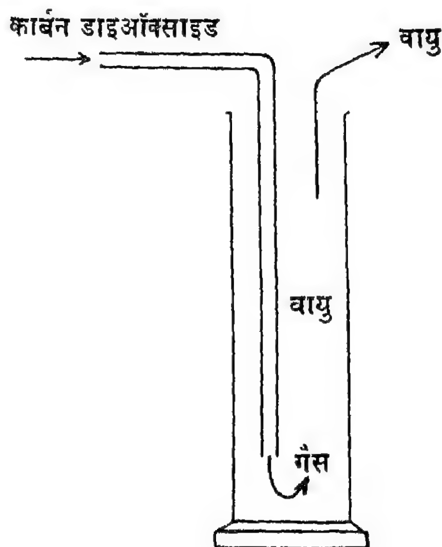
प्रयोग 4.

किप के उपकरण के बीच के गोले में संगमरमर के छोटे-छोटे टुकड़े रखिए। इस गोले के मुँह को

रबड़ की ऐसी डाट से बंद कीजिए जिसमें कॉच का स्टापकाक पड़ा हो। स्टापकाक को खोल कर थोड़ा-सा तनु हाइड्रोक्लोरिक एसिड ऊपर के गोले में छोड़िए और इतना एसिड छोड़िए कि संगमरमर के टुकड़ों को यह छूने लगे। स्टापकाक को बंद कर दीजिए और अधिक एसिड छोड़िए ताकि ऊपर का गोला एक चौथाई भर जाए। अब गैस की सप्लाई करने के लिए उपकरण तैयार है और स्टापकाक खोलकर जब चाहे गैस प्राप्त की जा सकती है। गैस को कुछ जारों में इकट्ठा कीजिए और उसके निम्न-लिखित गुणों की ओर ध्यान दीजिए:

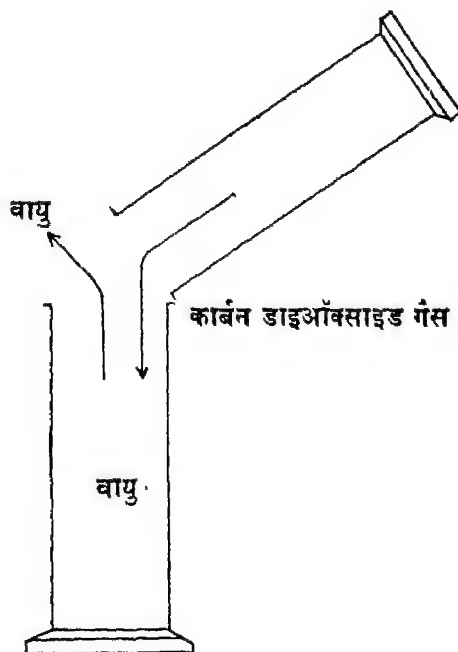
(1) गैस रंगहीन और गंधहीन है।

(2) यह गैस वायु से भारी है और इसे जैसा-कि चित्र-30 (क) में दिखाया गया है ऊपर की ओर वायु के विस्थापन द्वारा इकट्ठा किया जा सकता है।



चित्र-30. (क) कार्बन डाइअक्साइड वायु से भारी होती है। इसे ऊपर की ओर वायु के विस्थापन द्वारा एकत्र किया जा सकता है।

(3) इसे जैसाकि चित्र-30 (ख) में दिखाया गया है, एक जार से दूसरे जार में पलटा जा सकता है।

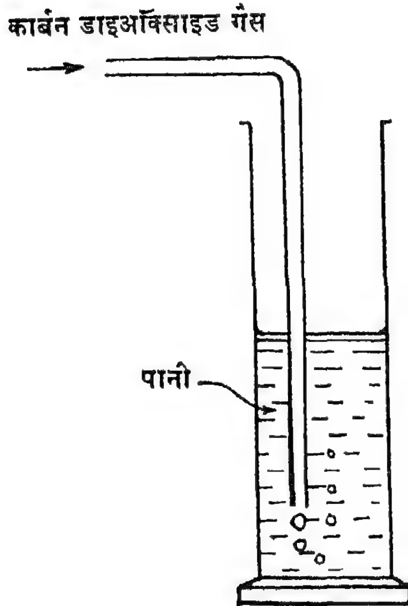


चित्र-30. (ख) कार्बन डाइअक्साइड भारी गैस है। इसे एक जार से दूसरे जार में पलटा जा सकता है।

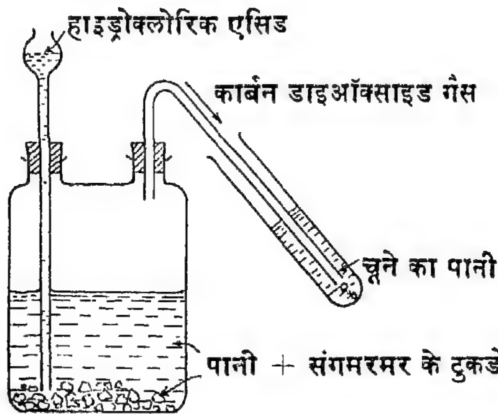
(4) यह जल में घुल जाती है और इसका जलीय घोल नीले लिटमस को लाल कर देता है। (चित्र-31 देखिए)

(5) यह चूने के पानी को दूधिया बना देती है और जब गैस लगातार छोड़ी जाती है तो यह दूधियापन गायब हो जाता है। (देखिए चित्र-32 (क)

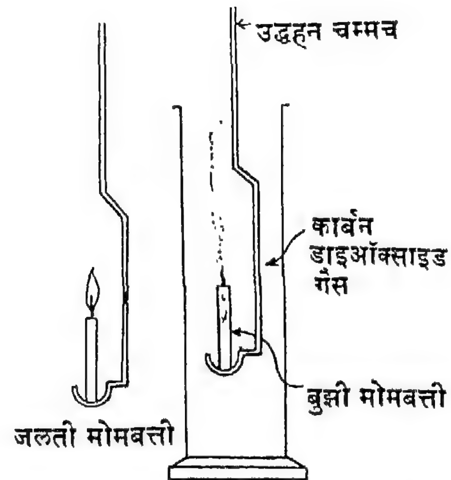
(6) जलती हुई मोमबत्ती इससे बुझ जाती है (देखिए चित्र-32 (ख)



चित्र-31. कार्बन डाइआक्साइड जल में विलयशील है।



चित्र-32. (क) कार्बन डाइआक्साइड चूने के पानी को दूधिया बना देती है।



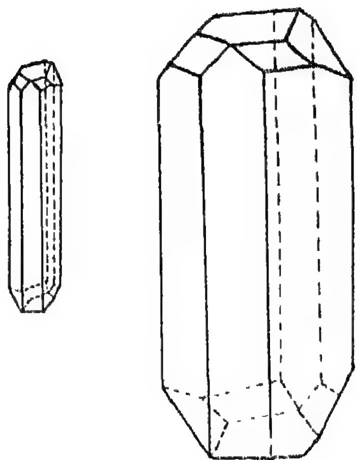
चित्र-32. (ख) कार्बन डाइआक्साइड से जलती हुई मोमबत्ती बुझ जाती है।

3.5 गंधक

गंधक भी एक अधातु है जो प्रकृति में मुक्त रूप में मिलती है। सामान्य गंधक पीले रग का ठोस द्रव्य है और इसके विषमलंबाक्ष क्रिस्टल होते हैं। (चित्र-33 देखिए)। यह पानी में नहीं घुलती किन्तु कार्बनिक विलायकों जैसे कार्बन डाइसल्फाइट और कार्बन टैट्राक्लोराइड में शीघ्र घुल जाती है।

प्रयोग 5.

तीन परखनलियाँ लीजिए। एक में पानी, दूसरी में कार्बन डाइसल्फाइड और तीसरी में कार्बन टट्राक्लोराइड लीजिए। तीनों में गंधक का थोड़ा-थोड़ा चूरा डालिए। फिर तीनों को खूब हिलाइए। आप देखेंगे कि गंधक पानी में नहीं घुलती किन्तु अन्य दोनों द्रवों में घुल जाती है। इन घोलों को वाच ग्लासों में लेकर इनका वाष्पन कीजिए। ऐसा करने पर गंधक के सुन्दर पीले क्रिस्टल (रवे) बन जाएँगे।



चित्र–33. *गंधक के विषमलंबाक्ष क्रिस्टल*

प्राकृतिक रूप में गंधक या तो भूमि की ऊपरी परत के नीचे, गहरी तलहटियों में या ज्वालामुखी क्षेत्रों में भूमि के ऊपर ही पाई जाती है। संयुक्त राज्य अमेरिका, इटली और जापान में भारी मात्रा में गंधक होती है। इटली में गंधक की खानें सिसली में ज्वालामुखियों के पास मिलती हैं। संसार की 13 प्रतिशत गंधक वहीं से मिलती है। संयुक्त राज्य अमेरिका में टैक्सास और लुइसियाना के पास भूमि में लगभग 1000 फुट की गहराई पर मिलती है। यह भी दुनिया भर मे गंधक का बहुत बड़ा भंडार माना जाता है।

3.6 उत्पादन और शोधन

यदि पृथ्वी की सतह पर गंधक पाई जाती हो तो साधारण खनन द्वारा इसे निकाला जा सकता है। यदि यह गहराई पर पाई जाती है तो इसे गर्म हवा और अति तप्त पानी छोड़कर बाहर निकाला जाता है। यह गंधक 99 5 प्रतिशत शुद्ध होती है। आसवन और ऊर्ध्वपातन द्वारा इसे और अधिक शुद्ध किया जा सकता है। अशुद्ध गंधक को ऐसे बर्तनों में गर्म किया जाता है जो ठंडे कक्ष से जुड़े होते हैं। ठंडे कक्ष में जाकर गंधक की वाष्प ठंडी पड़ जाती है और आरंभ में हल्के पीले रंग के चूर्ण के रूप में जमा होने लगती है। इस चूर्ण को गंधक के फूल कहते हैं। कुछ देर के बाद कक्ष गर्म हो जाता है और उसके फर्श पर एक द्रव्य-सा दिखाई देने लगता है। पिघली हुई इस गंधक को शलाकाओं का रूप दे दिया जाता है और इन्हें गंधक शलाका कहते हैं।

3.7 गंधक का महत्व

गंधक महत्वपूर्ण रासायनिक पदार्थ है और बहुत-से उद्योगों में काम आती है। गंधक का अम्ल या तेजाब भी इसीसे बनता है। रबड़ उद्योग में वैकल्नीकरण भी गंधक से ही किया जाता है। एबोनाइट भी कच्चे रबड़ और गंधक के मेल से बनता है जो विद्युत रोधन पदार्थ है। बारूद जैसे विस्फोटक पदार्थ और *अल्ट्रामैरिन* नामक नीले वर्णक गंधक से ही बनते हैं। कार्बन डाइसल्फाइड जैसे विलायक भी इसी से तैयार होते हैं। कीड़े मारने में भी इसका इस्तेमाल किया जाता है और कुछ दवाओं में भी गंधक काम में लाई जाती है।

3.8 गंधक के रूप और तात्विक विशेषताएँ

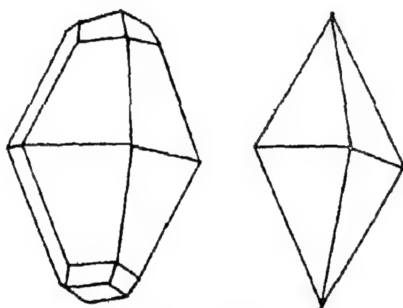
कार्बन की तरह गंधक भी कई रूपों में पाई जाती है। कुछ रवेदार (क्रिस्टलीन) और कुछ रवा-हीन होते हैं। इन सबके ऑक्सीजन में जलने से सल्फर डाइआक्साइड ही बनता है। किसी रूप में भी एक ग्राम गंधक के जलने से उतनी ही मात्रा में अर्थात 2 ग्राम सल्फर डाइआक्साइड बनता है।

गंधक के जो भिन्न-भिन्न रूप हैं उनके केवल भौतिक गुणों में ही अंतर दिखाई देता है और इसी कारण इन्हें गंधक का अप्ररूपी रूपांतरण कहते हैं।

साधारण गंधक रवेदार या क्रिस्टलीय होती है। यह कार्बन डाइसल्फाइड और बेंजीन जैसे विलायकों में से विषमलंबाक्ष क्रिस्टलों का रूप धारण करती है जैसाकि चित्र-33 में दिखाया गया है। गर्म करने पर अन्य रवेदार पिंडों के समान गंधक भी पिघल जाती है। यह जिस तापमान पर पिघलती है उसे *गलनांक* कहते हैं। *विषमलंबाक्ष गंधक* का गलनांक 112·8 डिग्री सेंटीग्रेड है। इसका विशिष्ट घनत्व 2·07 है।

प्रयोग 6. एकनताक्ष गंधक का बनाना

थोड़ी-सी साधारण गंधक लेकर उसे एक प्याली में पिघलाइए और फिर इसे धीरे-धीरे तब तक ठंडा कीजिए जब तक इसके ऊपर एक पपड़ी न जम जाए। इस पपड़ी में सूई से छेद कर दीजिए और तरल गंधक को इसमें से बाहर निकाल लीजिए। बची हुई गंधक में गहरे पीले रंग की सुई जैसे रवे (क्रिस्टल) होंगे जैसेकि चित्र-34 में दिखाए गए हैं। इसे B-सल्फर (*Greek*—B-*Sulphur*) या *एकनताक्ष गंधक* कहते हैं। यह 119·2 डिग्री सें० पर पिघलती है और इसका विशिष्ट घनत्व 1·96 होता है। यह 119·2 डिग्री सें० और 95·5 डिग्री सें० के बीच में स्थायी रहती है। इससे नीचे तापमान पहुँचने पर फिर से विषमलंबाक्ष गंधक में बदल जाती है।



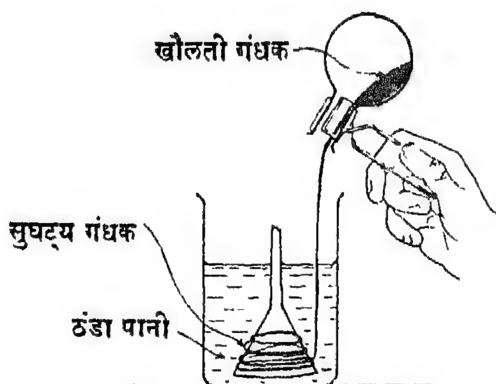
चित्र-34. *गंधक के एकनताक्ष क्रिस्टल*

प्रयोग 7. सुघट्य गंधक का बनाना

एक गोल तली की फ्लास्क में पिसी हुई गंधक शलाका लीजिए और इसे हल्के-हल्के गर्म कीजिए। आप देखेंगे कि जब गंधक को धीरे-धीरे गर्म करके खौलने के बिंदु तक गर्म किया जाता है तो इसमें बड़े मनोरंजक परिवर्तन होते हैं। यह 112·8 डिग्री सें० पर पीले द्रव्य में बदल जाती है। फिर और अधिक गर्म करने पर लाल भूरे रंग की हो जाती है और 250 डिग्री सें० पर यह इतनी श्यान हो जाती है कि इसे फ्लास्क से बाहर नहीं पलटा जा सकता।

लगभग 300 डिग्री सें० पर श्यान गंधक फिर से गतिशील हो जाती है और 444·6 डिग्री सें० पर यह खौलने लगती है और इसमें से नारंगी-पीले रंग की वाष्प निकलने लगती है। आप यह भी देखेंगे कि खौलती हुई गंधक को जब धीरे-धीरे ठंडा किया जाता है तो इसमें पहले जैसे ही परिवर्तन उलटी दिशा में होने लगते हैं। अब खौलती हुई तथा पिघली हुई गंधक को एक बीकर में पतली-सी धार से ठंडे पानी में उलटाई हुई कीप पर छोड़िए जैसाकि चित्र-35 में दिखाया गया है। आप देखेंगे कि गंधक गाढ़ी-गाढ़ी भूरे रंग की डोरी की तरह बन जाएगी। वह *सुघट्य गंधक* है। यह रवाहीन गंधक है और यह पानी तथा कार्बन डाइसल्फाइड में नहीं घुलती। किन्तु इस रूप में भी यह अस्थायी

होती है और यदि इसे एक दिन ऐसे ही रखा जाए तो यह फिर विषमलंबाक्ष रूप धारण कर लेती है। जब खौलती हुई गंधक की वाष्प को एकदम ठंडा किया जाता है तो यह *गंधक के फूलों* (फ्लावर्स ऑफ सल्फर) के रूप में *संघनित हो जाती है।*



चित्र-35. *सुघट्य गंधक का बनाना*

गुणों की दृष्टि से गंधक भी कार्बन की तरह एक प्ररूपी अधातु है। यह अचालक है। इसके तार नहीं खींचे जा सकते और न ही इसे धातुओं की तरह हथौड़े से पीट कर बढ़ाया जा सकता है। यह ताँबे, लोहे और जस्त जैसी धातुओं से संयोजित होकर यौगिक बनाती है, जिन्हें *सल्फाइड* कहते हैं। यह वायु या ऑक्सीजन में जल जाती है और इससे सल्फर डाइऑक्साइड निकलती है जो अम्लीय होती है और नीले लिटमस को लाल कर देती है। जब खौलती हुई गंधक में से हाइड्रोजन गुजारी जाती है तो एक महत्वपूर्ण गैसीय यौगिक बन जाता है। उसे *हाइड्रोजन सल्फाइड* कहते हैं। गंधक अधातुओं से भी सयोजित होती है किन्तु धातुओं की अपेक्षा कम ओज से संयोजित होती है। जब गंधक कोक के साथ बहुत प्रबलता से गर्म की जाती है तो गंधक और कार्बन के मेल से एक महत्वपूर्ण विलायक तैयार होता है जिसे *कार्बन डाइसल्फाइड* कहते हैं।

3.9 सल्फर डाइऑक्साइड

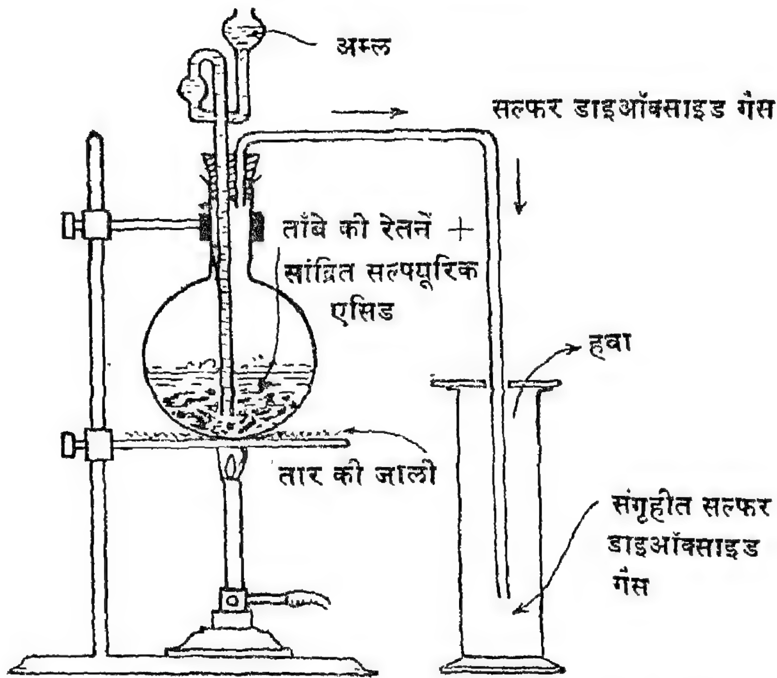
जब गंधक को या लोहे के सल्फाइड जैसे धातुओं के सल्फाइडों को हवा में जलाया जाता है तो सल्फर डाइऑक्साइड गैस तैयार होती है। उद्योगों में भी यह इसी ढंग से तैयार की जाती है। प्रयोगशाला में यह आमतौर से ताँबे की छीलन और सांद्रिक गंधक के तेजाब के साथ गर्म करने से बनाई जाती है। नीचे के प्रयोग में इस विधि को समझाया गया है।

प्रयोग 8.

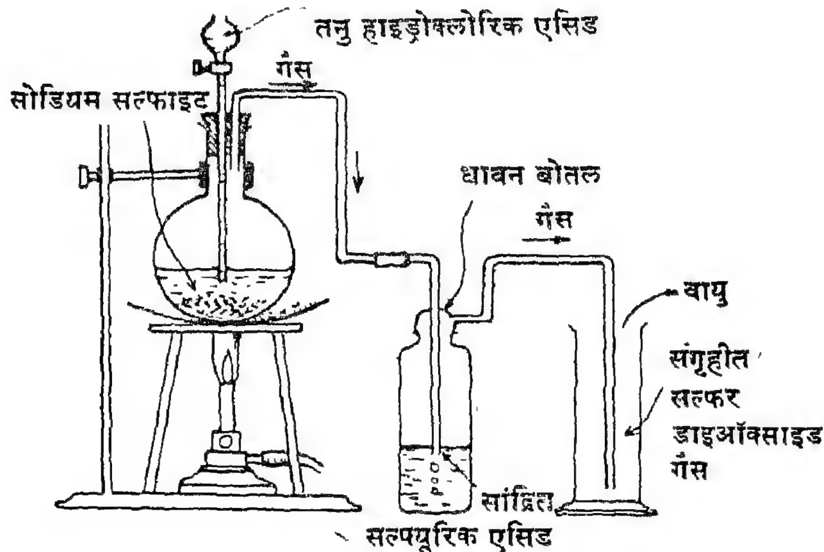
250 घन सें० के गोल तली के फ्लास्क में थोड़ी-सी ताँबें की छीलन लीजिए। अब इसे एक थिसिल कीप और निकासी नलकी से जोड़िए जोकि चित्र-36 की तरह गैस जार में पड़ी हुई हो।

कीप में से फ्लास्क में थोड़ा-सा सांद्रित गंधक का तेजाब (सल्फ्यूरिक एसिड) छोड़िए। तारों की जाली नीचे रखकर फ्लास्क को गर्म कीजिए। अब क्रिया आरंभ होगी। ताँबे से गंधक का तेजाब अपघटित होगा और सल्फर डाइऑक्साइड बन जाएगी। हवा के ऊपर के विस्थापन द्वारा जारों में गैस भरिए।

प्रयोगशाला में सल्फर डाइऑक्साइड और भी आसानी से तैयार किया जा सकता है। इसकी विधि यह है कि जैसाकि चित्र-37 में दिखाया गया है, ठोस सोडियम सल्फाइट पर गंधक का तेजाब या हाइड्रोक्लोरिक एसिड डाला जाता है।



चित्र–36. *प्रयोगशाला में ताँबे और सांद्रित गंधक के तेजाब से सल्फर डाइआक्साइड का बनाना*



चित्र-37. *प्रयोगशाला में सल्फाइड और एक अम्ल से सल्फर डाइआक्साइड का बनाना*

गैस के गुणों का ध्यान से अध्ययन कीजिए और आप देखेंगे कि—

(1) गैस रंगहीन होती है और इसकी गंध दम घोटने वाली होती है।

(2) गैस वायु से भारी होती है।

(3) यह गैस पानी में बहुत ही अच्छी तरह विलीन हो जाती है, और इसके बाद जो घोल बनता है, वह अम्लीय होता है।

प्रयोग 9. झरना प्रयोग

एक फ्लास्क में सूखी सल्फर डाइआक्साइड ले लीजिए। फ्लास्क के मुँह में ऐसी डाट लगाइए जिसमें से काँच की नली गुजर रही हो। काँच की नली समेत फ्लास्क को उलट दीजिए ताकि काँच की नली रंगीन पानी में डूबी रहे। यह पानी चित्र-38 की तरह नीले लिटमिस से रंगीन किया गया हो। आप देखेंगे कि कुछ देर बाद रंगीन पानी फ्लास्क में चढ़ता है और फव्वारे की तरह पानी नलकी से निकलने लगता है और नीले की बजाय लाल होता चला जाता है। इससे यह पता चलता है कि फ्लास्क में जो गैस है वह अम्लीय प्रकृति की है।

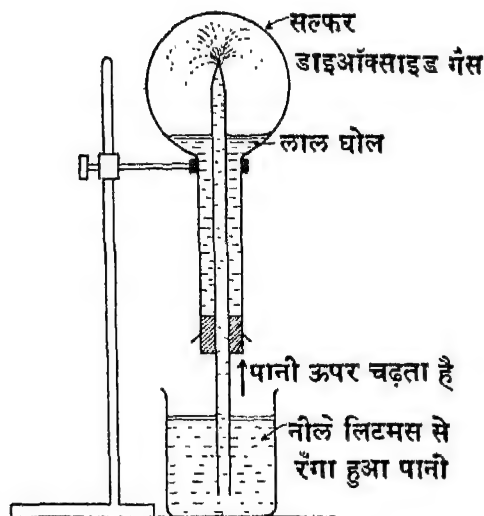
(4) गैस जलती नहीं।

प्रयोग 10.

गैस से भरे हुए एक जार में जलती हुई लकड़ी की खपची डालिए। आप देखेंगे कि खपची एकदम बुझ जाएगी और गैस भी नहीं जलेगी।

(5) अम्ल युक्त पोटासियम परमैंगनेट के घोल को यह गैस रंगहीन कर देती है जबकि यह घोल में से गुजरती है या घोल ऐसे जार में उलट दिया जाता है जिसमें गैस भरी हो।

(6) लाल फलालेन के गीले टुकड़े का यह गैस रंग उड़ा देती है। इसी तरह यदि गैस भरे जार में रंगीन फूल डाला जाए तो उसका रंग भी उड़ जाता है।



चित्र-38. *फव्वारे का प्रयोग*

सल्फर डाइआक्साइड उपयोगी पदार्थ है। औद्योगिक निर्माण में यह सल्फ्यूरिक एसिड या गंधक का तेजाब बनाने के काम आता है। गंधक का तेजाब प्रयोगशाला में बहुत महत्वपूर्ण अभिकर्मक होता है और रसायन उद्योग में इससे और बहुत-से रसायन बनते हैं।

सल्फर डाइआक्साइड बहुत से अतिसूक्ष्म जीवाणुओं को मार डालता है और इस कारण यह फफूंद और जीवाणुओं को नष्ट करने के काम आता है। खुबानी और प्रून (Prunes) जैसे फलों को सुखा कर रखने में यह परीक्षक का काम देता है। चूने के पानी में सल्फर डाइआक्साइड के घोल से लकड़ी से कागज तैयार होता है। लिनकों, ऊन और रेशम का रंग उड़ाने के

लिए सल्फर डाइआक्साइड का इस्तेमाल किया जाता है ।

3.10 हाइड्रोजन सल्फाइड या सल्फरेटेड हाइड्रोजन

हाइड्रोजन सल्फाइड बहुत ही दुर्गंध वाली रंगहीन गैस है । किन्तु रासायनिक विश्लेषण में यह बहुत उपयोगी होती है । हर रसायन प्रयोगशाला मे यह गैस आपको मिलेगी और यह चित्र-29 (देखिए कार्बन डाइआक्साइड) में दिखाए गए किप के उपकरण मे तैयार होती है । चित्र-23 मे दिखाई गई वूल्फ बोतल में तनु अम्ल (प्रायः *गधक का तेजाब*) आयरन सल्फाइड पर डालने से भी यह गैस बनती है । वायु से ऊपर की ओर विस्थापन द्वारा यह गैस जमा की जाती है । यह ध्यान रखें कि गैस की गंध बहुत *अप्रिय* और सड़े अंडों की जैसी गंध होती है । साथ ही यह गैस *विषैली* भी होती है ।

हाइड्रोजन सल्फाइड वायु से कुछ भारी होती है । यह पानी में घुल जाती है और इसका जलीय घोल हल्का अम्लीय होता है । क्षारों के साथ इसकी अभिक्रिया से सल्फाइड बनते हैं । बहुत-से धातु लवणों के साथ इसकी अभिक्रिया से रंगीन सल्फाइड बनते हैं ।

प्रयोग 11.

किप के उपकरण से हाइड्रोजन सल्फाइड ताँबे, सीसे, कैडमियम और ऐंटीमनी के लवणों के घोलों में छोड़िए । गैस छोड़ने पर सब घोलों में अलग-अलग रंग (काला, पीला और नारंगी) आएगा ।

प्रयोग 12.

हाइड्रोजन सल्फाइड भरे जार में जलता हुआ फीता डालिए । आप देखेंगे कि यह गैस ज्वलनशील है और इसके जलने से नीली लौ निकलती है ।

3.11 फॉस्फोरस

फॉस्फोरस भी एक और अरूपी अधातु है । यह प्रकृति में शुद्ध रूप में नहीं मिलती क्योंकि यह अत्यंत अभिक्रियाशील है । यह बहुत महत्वपूर्ण और उपयोगी मूलतत्व है और यह तीन रूपों में पाई जाती है । सामान्य फॉस्फोरस प्रायः पीला पिंड होती है और शुद्ध रूप में यह रंगहीन होती है । इसी कारण इसे *श्वेत फॉस्फोरस* कहते हैं । देखने मे यह मोम जैसी जलती है और इतनी मुलायम होती है कि इसे सरलता से चाकू से काटा जा सकता है । यह 44·2 डिग्री सें० के नीचे तापमान पर पिघल जाती है और 380·5 डिग्री सें० पर खौलने लगती है । इसका विशिष्ट घनत्व 1·82 होता है । वायु में 40 डिग्री सें० पर यह स्वतः जल उठती है, इसलिए इसे वायु के संपर्क में नहीं रखना चाहिए । पानी का इस पर कोई प्रभाव नहीं होता, इसी कारण इसे पानी में ही रखना चाहिए ।

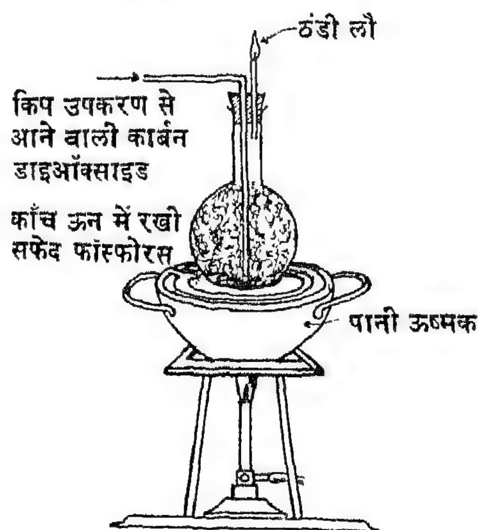
कार्बन डाइसल्फाइड, बेंजीन और जैतून (आलिव) के तेल में फॉस्फोरस जल्दी ही घुल जाती है। जब इसे वायु में गर्म किया जाता है तो यह ऑक्सीजन में मिल जाती है। यह मिलने से फॉस्फोरस पेंटाक्साइड बनता है जो अम्लीय होता है । सामान्य तापमान पर धीरे-धीरे वायु के साथ अभिक्रिया करती है और इससे सफेद प्रकाश निकलता है जो अँधेरे में अच्छी तरह दिखाई देता है । इस घटना को स्फुरदीप्ति (फॉस्फोरेसेन्स) कहते हैं ।

प्रयोग 13. स्फुरदीप्ति (फॉस्फोरेसेन्स) की घटना

सफेद फॉस्फोरस के कुछ टुकड़े लेकर काँच तंतुओं के बीच में रखकर एक फ्लास्क में रखिए

जिसमें चित्र-39 की तरह काँच की नलियाँ लगी हों। फ्लास्क में से कार्बन डाइआक्साइड गैस की धारा गुजारिए। फ्लास्क को पानी के ऊष्मक में गर्म कीजिए। इस उपकरण को बंद कमरे में रखिए। आप देखेंगे कि काँच की नली के ऊपर से ठंडी लौ निकल रही है। इसी को स्फुरदीप्ति या फॉस्फोरेसेन्स कहते हैं।

सावधानी : सफेद फॉस्फोरस विषैली होती है और इसकी थोड़ी-सी मात्रा से भी मृत्यु हो जाती है।



चित्र 39. स्फुरदीप्ति

जब सफेद फॉस्फोरस को वायु के संपर्क के बिना बहुत समय तक 250 से 300 डिग्री सें० पर गर्म किया जाता है तो यह स्थायी रूप में बदल जाता है जिसे लाल फॉस्फोरस कहते हैं। प्रकाश की उपस्थिति में भी धीरे-धीरे यही परिवर्तन होता है। लाल फॉस्फोरस सफेद फॉस्फोरस से बहुत भिन्न होता है। इसका विशिष्ट घनत्व 2·20 होता है। यह कार्बन डाइसल्फाइड में नहीं घुलती और न ही इससे स्फुरदीप्ति होती है। वायु के साथ भी यह धीरे-धीरे ही अभिक्रिया करती है। यह इतनी विषैली नहीं होती और इसी कारण इस प्रकार की फॉस्फोरस व्यवहार में सुरक्षित रहती है। यह वायु में अपेक्षाकृत अधिक ऊँचे तापमान (260 डिग्री) पर जलती है और इससे भी वही ऑक्साइड (पेंटाक्साइड) व सफेद फॉस्फोरस के अनुपात में ही बनता है। 500 से 600 डिग्री सें० तक लाल फॉस्फोरस को गर्म करके सफेद फॉस्फोरस में बदला जा सकता है। हवा का संपर्क न रहने और वाष्प को ठंडा करने पर ऐसा होता है। जब लाल फॉस्फोरस को 350 डिग्री से० तक दाब के अधीन गर्म किया जाता है तो यह एक और प्रकार के फॉस्फोरस में बदल जाता है जिसे *काला फॉस्फोरस* कहते हैं। देखने में यह ग्रेफाइट से मिलता-जुलता होता है। काला फॉस्फोरस केवल 490 डि० सें० पर जलता है और यह फॉस्फोरस का सघनतम रूप है जिसका विशिष्ट घनत्व 2·70 होता है।

इस प्रकार फॉस्फोरस तीन अपररूपी रूपांतरणों में पाई जाती है। इसे और सरल पदार्थों में नहीं तोड़ा या बाँटा जा सकता। इस कारण इसे मूल-तत्व ही माना जाता है, जिसके विशेष प्रकार के अधात्विक गुण होते हैं।

3.12 फॉस्फोरस का उत्पादन

प्रकृति में फॉस्फोरस संयुक्त रूप से फॉस्फेट शिलाओं (अपरिष्कृत कैल्सियम फॉस्फेट) में व्यापक रूप में पाई जाती है। हड्डियों में फॉस्फोरस काफी परिमाण में होती है। इसी कारण या तो यह फॉस्फेट शिलाओं या हड्डियों से तैयार की जाती है। इनमें से जिस पदार्थ से फॉस्फोरस बनानी हो उसे पीस कर और रेते तथा कोयले (कोक) में मिलाकर वायु की अनुपस्थिति में बिजली की

भट्टी में गर्म किया जाता है। फॉस्फोरस वाष्प के रूप में भट्टी में से निकलती है और पानी के नीचे सफेद फॉस्फोरस के रूप में संघनित हो जाती है।

3.13 फॉस्फोरस के उपयोग

फॉस्फोरस के दो महत्वपूर्ण यौगिक बनते हैं। इनमें से एक फॉस्फोरस पेंटाक्साइड होता है जिसमें जल की वाष्प सोखने और दूसरे यौगिकों में से पानी को अलग करने की क्षमता बहुत होती है। अतः प्रयोगशाला में इसी काम के लिए इसका इस्तेमाल किया जाता है। दूसरा यौगिक फॉस्फोरिक एसिड है जो फॉस्फोरस पेंटाक्साइड को पानी में विलय करके बनाया जाता है। इससे महत्वपूर्ण लवण तैयार होते हैं जिन्हें फॉस्फेट कहा जाता है। फॉस्फोरस सैनिक उपयोगों में भी काम आता है। जब यह जलता है तो इससे घना सफेद धुआँ निकलता है, इसलिए इससे धूमपट्ट गोले बनाए जाते हैं।

संक्षेप

कार्बन एक ठोस प्रकार का मूलतत्व है। यह *अप्ररूपता* प्रकट करती है और एक से अधिक रूप में पाई जाती है। इसके प्रत्येक रूप के रासायनिक गुण समान होते हैं परंतु भौतिक गुण भिन्न होते हैं। *हीरा* और *ग्रेफाइट* कार्बन के रवेदार या क्रिस्टलीय रूप हैं। जबकि *कोक* और लकड़ी का कोयला अक्रिस्टलीय या रवाहीन रूप हैं। कार्बन एक खास प्रकार की अधातु है। जलने पर इससे कार्बन डाइऑक्साइड निकलती है, जो प्रकृति में *प्रकाशसंश्लेषण* द्वारा एक बहुत बड़ा काम करती है।

गंधक एक मूलतत्व है जो ठोस होती है। यह पीले रंग की होती है और कार्बन डाइसल्फाइड में घुल जाती है।

गंधक प्ररूपी अधातु है। यह अपररूपी रूपों में पाई जाती है जो रवेदार या रवेहीन दोनों ही प्रकार के होते हैं।

वायु में गंधक (सल्फर) जल जाती है और इससे सल्फर डाइऑक्साइड बनता है और यह हाइड्रोजन से भी संयुक्त हो जाती है और इससे हाइड्रोजन सल्फाइड बनता है।

सल्फर डाइऑक्साइड और सल्फ्यूरिक एसिड सल्फर से ही बनते हैं।

फॉस्फोरस एक मूलतत्व है। यह ठोस रूप में मिलता है और कई अपररूपों (लाल, सफेद और काले) में पाया जाता है। सफेद फॉस्फोरस ज्वलनशील पदार्थ है और यह बहुत अधिक विषैला होता है। मुँह बंद बोतलों में यह पानी के नीचे सुरक्षित रहता है।

फॉस्फोरस से *स्फुरदीप्ति (फास्फोरेसेन्स)* प्रकट होती है अर्थात् अँधेरे में यह चमकती है।

फॉस्फोरस एक प्ररूपी अधातु है।

जब फॉस्फोरस वायु में या ऑक्सीजन में जलती है तो इससे फॉस्फोरस पेंटाक्साइड बनता है जो पानी में घुल जाता है और इसके पानी में घुलने से फॉस्फोरिक ऐसिड बनता है।

फॉस्फोरस हड्डियों का एक अवयव है।

अधातुएँ ऑक्सीजन से मिलकर रासायनिक यौगिक बनाती है जिन्हे ऑक्साइड कहते हैं। यह ऑक्साइड पानी में घुल जाते हैं और घुलने से जो यौगिक बनते हैं वे अम्ल कहे जाते हैं।

दोहराने के लिए प्रश्न

1. कार्बन के भिन्न-भिन्न रूपों का नाम लीजिए। इनमें अंतर क्या है?
2. अप्ररूपता का क्या अर्थ है? अपने उत्तर को कार्बन, सल्फर और फॉस्फोरस के उदाहरण देकर समझाइए।
3. ग्रेफाइट, हीरे, काजल और कोक के प्रमुख उपयोग बताइए।
4. आप यह कैसे प्रकट करेंगे कि कार्बन के भिन्न-भिन्न रूप रासायनिक रूप से समान होते हैं।
5. उस गैस का नाम बताइए जो बहुत अधिक मात्रा में वायु या ऑक्सीजन में कार्बन के जलने से बनती है?
6. प्रयोगशाला में कार्बन डाइआक्साइड बनाने की विधि बताइए?
7. जीवन में कार्बन ऑक्साइड का महत्व दर्शाइए। इससे आग क्यों बुझ जाती है?
8. किप के उपकरण का एक साफ चित्र बनाइए और इस बात को स्पष्ट कीजिए कि कार्बन डाइआक्साइड बनाने में इनका क्या उपयोग है।
9. अधातु की विशेषताएँ बताइए।
10. हम यह कैसे कह सकते हैं कि गंधक एक तत्व है? इसके महत्वपूर्ण प्रयोग भी बताइए।
11. गंधक के महत्वपूर्ण अप्ररूपी रूपों का नाम लीजिए। ये कैसे बनते हैं?
12. उस गैस का नाम बताइए जो गंधक के वायु या ऑक्सीजन में जलाने से तैयार हो जाती है। प्रयोगशाला में इसके बनाने की विधि बताइए।
13. हाइड्रोजन सल्फाइड क्या है और प्रयोगशाला में यह कैसे बनाया जाता है?
14. इस बात को समझाइए कि ताँबे और चाँदी के बर्तन हवा में काले क्यों पड़ जाते हैं।
15. क्या होता है जब :
    क) संगमरमर के टुकड़े जब अम्ल के संपर्क में आ जाते हैं।
    ख) चूने का पत्थर गर्म किया जाता है।
    ग) कोक जलता है।

घ) चूने के पानी में से कार्बन डाइऑक्साइड गैस गुजरती है ।

च) वायु या ऑक्सीजन में गंधक जलती है ।

छ) सांद्रित सल्फ्यूरिक एसिड में जब तांबे की रेतनी गर्म की जाती हैं ।

ज) सोडियम सल्फाइट की हाइड्रोक्लोरिक एसिड से अभिक्रिया होती है ।

झ) पिघली हुई गंधक में जब हाइड्रोजन गुजारी जाती है ।

ट) जब पोटासियम परमैंगनेट के अम्लीय घोल मे से सल्फर डाइआक्साइड होकर जाती है ।

ठ) कॉपर सल्फेट के घोल में से हाइड्रोजन सल्फाइट गैस फूंकी जाती है ।

16. हम यह क्यों कहते हैं कि फॉस्फोरस एक प्ररूपी अधातु है ?

17. फॉस्फोरस की बंद बोतलों को पानी के नीचे क्यों रखते हैं ?

18. फॉस्फोरस की रूपता के बारे में संक्षिप्त नोट लिखिए ।

19. प्रकृति में फॉस्फोरस कैसे मिलती है । इसे कैसे निकाला जाता है ?

20. फॉस्फोरस के उपयोग बताइए ।

21. जब फॉस्फोरस वायु या ऑक्सीजन में जलाई जाती है तो कौनसी वस्तु बनती है ? इस वस्तु के उपयोग बताइए ।

22. श्वेत फॉस्फोरस और लाल फॉस्फोरस में क्या अंतर है ?

अध्याय 4

कुछ सामान्य धातुएँ

4.1 धातुओं की विशेषताएं

हम अब तक कुछ सामान्य वस्तुओं के रसायन का अध्ययन कर चुके हैं जो कि अधातुएँ कहलाती हैं। धातुएँ भी मूलतत्व हैं और इनके गुण स्पष्ट रूप से भिन्न होते हैं। सोना *धातु* का एक प्ररूपी उदाहरण है। यह बहुत भारी होता है और इसमें बड़ी चमक होती है तथा यह बिजली और ऊष्मा दोनों का चालक है। इसके बहुत पतले-पतले तार खीचे जा सकते हैं और इसके इस गुण को *तन्यता* कहते हैं। हथौड़े से पीट कर इसके बहुत बारीक वर्क भी बनाए जा सकते है। इस गुण को *अघात-वर्ध्यता* कहते हैं। सब धातुओं में प्रायः सारे ही अभिलक्षण पाए जाते हैं।

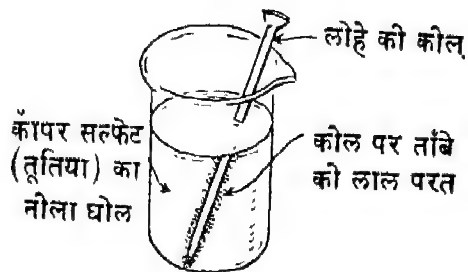
बहुधा जब दो या अधिक धातुओं को इकट्ठा पिघला दिया जाता है तो जो हमें समागी पदार्थ मिलते हैं, उन्हें *मिश्र धातु या अलाय* कहते है; जैसे पीतल, काँसा और जंगरोधी इस्पात (स्टेनलेस स्टील)। पारे की मिश्र धातु को *पारद-धातु मिश्रण या अमलगम* कहते हैं। इसके अलावा धातुएँ ऑक्सीजन से संयोजित होती हैं और इससे ऑक्साइड बनते हैं। ये ऑक्साइड अम्लों में घुल कर लवण बनाते हैं। ये *ऑक्साइड क्षारकीय ऑक्साइड* कहलाते है और कार्बन की सहायता से ये फिर धातुओं में बदल जाते हैं।

प्रयोग 1.

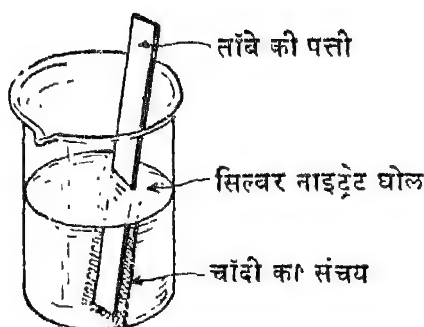
शुद्ध ताँबे का एक तार लेकर उसे बुन्सन ज्वाला (बर्नर) में खूब गर्म कीजिए, जब तक कि यह काला न पड़ जाए। गर्म होने से ताँबा वायु की ऑक्सीजन से सयुक्त होकर ताँबे के काले ऑक्साइड में बदल जाता है।

ऑक्सीकृत ताँबे के तार को एक बीकर में हाइड्रोक्लोरिक एसिड में रखिए। आप देखेंगे कि काला ऑक्साइड घुल जाएगा और ताँबे के लवण का हरे रंग का घोल तैयार हो जाएगा।

बहुत-सी धातुएँ अम्लों मे घुल जाती हैं और इससे लवण बन जाते हैं। घटिया धातुएँ उत्कृष्ट धातुओं को विस्थापित कर देती हैं। उदाहरण के लिए जस्त सोने को, लोहा ताँबे को और ताँबा चाँदी को विस्थापित कर देता है (चित्र-40 तथा 41)।



चित्र-40. *लोहे द्वारा ताँबे का विस्थापन*



चित्र-41. *ताँबे द्वारा चाँदी का विस्थापन*

प्रयोग 2. घोल में एक धातु का दूसरी धातु में विस्थापन

एक बीकर में थोड़ा-सा कॉपर सल्फेट का घोल लीजिए। इस घोल में लोहे की एक कील डालिए। आप देखेंगे कि थोड़ी देर में लोहे की कील के ऊपर ताँबे की लाल परत जम जाएगी। यह ताँबा घोल में से निकल कर जमा हुआ है। कील का लोहा घोल में घुल कर आयरन सल्फेट बनाता है। (देखिए चित्र-40)। ताँबे की तुलना मे लोहा घटिया धातु है और यह अधिक अभिक्रियाशील है।

कुछ सामान्य धातुओं का प्रारंभिक रसायन नीचे दिया जाता है।

4.2 सोना

सोना बहुत प्राचीन काल से एक परिचित धातु है। संसार के कई भागों में यह शुद्ध रूप में मिलता है, परंतु बहुत दुर्लभ है। इस पर वायु, जल, क्षारों, अम्लों और अग्नि का कोई प्रभाव नहीं होता। इस गुण के कारण यह बहुमूल्य धातु समझी जाती है। इसे उत्कृष्ट धातु कहते हैं और यह आभूषणों और सिक्कों के बनाने में व्यापक परिमाण में काम आती है।

4.3 सोने की प्राप्ति और उत्पादन

संसार के बहुत-से भागों में प्राकृतिक सोना मिलता है। कभी-कभी इसके जलोढ कण या टुकड़े भी मिलते हैं, किन्तु सामान्यतः यह स्फटिक में छोटे-छोटे कणों की शक्ल में ही मिलता है। भारत में सोना —कोलार (मैसूर राज्य) की खानों से मिलता है। कुछ नदियों के जलोढ निक्षेपों में जैसे *स्वर्ण रेखा, ब्रह्मपुत्र* और *सिन्धु* के जलोढ निक्षेपों में सोने के सूक्ष्म कण होते हैं।

सोना या तो पारदन प्रक्रिया द्वारा या सायनाइड प्रक्रिया द्वारा निकाला जाता है।

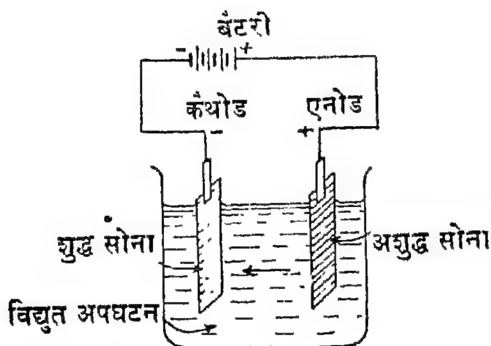
(1) *पारदन प्रक्रिया :* बारीक रेते या सोने वाली स्फटिक को पानी में गारे की तरह सान लिया जाता है। इस गारे को अमलगमित ताँबे की पत्तरों पर डाला जाता है। सोने के कण पारद के साथ पारद-धातु मिश्रण बनाते हैं और ताँबे की पत्तरों पर जम जाते है। इस धातु मिश्रण या अमलगम को खुरच कर इसका आसवन किया जाता है। पारद अर्थात् पारा आसवित हो जाता है और इसे इकट्ठा कर दिया जाता है और सोना अवशिष्ट रह जाता है। (देखिए प्रयोग 4.)। किन्तु अब यह विधि पुरानी पड़ती जा रही है।

(2) *सायनाइड प्रक्रिया :* जिस मिट्टी या स्फटिक में सोना होता है उसे खूब बारीक पीसकर और पानी में मिलाकर उसे ढलवाँ मेज पर ऊपर से छोड़ा जाता है। सोने के कण भारी होने के कारण ढलवाँ मेज पर अटक जाते हैं और हल्की अशुद्धताएँ बह जाती हैं। इस प्रकार सोने

के जो कण इकट्ठे किए जाते हैं उन्हें पोटासियम सायनाइड के तनु घोल में मिलाया जाता है और इसके बाद 24 घंटों तक हवा लगने के लिए खुला रख दिया जाता है। सोना पोटासियम सायनाइड में वायु की उपस्थिति में घुल जाता है। छने हुए घोल में ताजा जस्त की छीलन डाल कर अवक्षेप के रूप में इसे छान लिया जाता है। इसके बाद वैद्युत अपघटन द्वारा इसे शोध लिया जाता है।

प्रयोग 3.

एक सेल में जलीय पोटासियम सायनाइड में घुले गोल्ड क्लोराइड का घोल लीजिए और इसमें से विद्युत की धारा गुजारिए। पोटासियम सायनाइड इसमें विद्युत अपघट्य होता है। अशुद्ध सोने की पतरी को एनोड और शुद्ध सोने की पतरी को कैथोड बनाया जाता है, जैसा कि चित्र-42 में दिखाया गया है। आप देखेंगे कि कैथोड वाली पतरी पर शुद्ध सोना जमा होने लगता है और यह पतरी भारी होने लगती है।



चित्र 42. *विद्युत अपघटन द्वारा सोने का शोधन।*

सावधानी : सायनाइड अत्यन्त विषैला होता है और इसे बहुत से पानी से धो डालना चाहिए।

4.4 सोने के गुण

सोना पीले रंग का ठोस पदार्थ है और बड़ा चमकदार होता है। इसमें जो भौतिक गुण होते हैं उनका पहले ही उल्लेख किया जा चुका है। यह स्थायी धातु होती है और अत्यन्त संक्षारण निरोधी होती है। फिर भी यह एकुवा रेजिया में घुल जाती है। (एकुवा रेजिया 1 : 3 के अनुपात में सांद्रित नाइट्रिक एसिड और सांद्रित हाइड्रोक्लोरिक का मिश्रण होता है)। ऐसा करने से गोल्ड क्लोराइड बनता है जो सोने के लवणों में सबसे अधिक महत्वपूर्ण होता है। वायु की उपस्थिति में यह पोटासियम या सोडियम सायनाइड के घोल में घुल जाता है। पारे में सोना घुलकर जो पदार्थ बनता है उसे गोल्ड *अमलगम* कहते हैं। जब इसे गरम किया जाता है तो पारा अलग हो जाता है और सोना पीछे बच रहता है।

प्रयोग 4.

सोने के एक तार को पारे में डुबाइए। आप देखेंगे कि तार पर चाँदी के रंग का सफेद मुलम्मा चढ़ जाएगा। बुन्सन ज्वाला में इसे गर्म कीजिए और इसे टांग्स या चिमटे से पकड़ लीजिए। आप देखेंगे कि सफेद मुलम्मा गायब होता जा रहा है और सोने का तार पहले जैसा चमकदार और पीला निकलता आ रहा है।

सावधानी : पारे की वाष्प जहरीली होती है।

शुद्ध सोना मुलायम होता है किन्तु ताँबे या चाँदी जैसी अन्य धातुओं के मेल से यह कठोर हो जाता है। इस कठोर सोने को *स्वर्ण धातु मिश्रण* कहते हैं और इससे ही सिक्के और गहने बनते हैं।

गोल्ड ऑक्साइड विशेष परिस्थितियों मे बनता है। गर्म होने पर यह अस्थायी हो जाता है और

सोने और ऑक्सीजन में अपघटित हो जाता है। यह ऑक्साइड अम्लों में घुल जाता है और घुलने से सोने के लवण बनते हैं और इस प्रकार यह क्षारकीय होता है। इसी प्रकार का एक लवण, गोल्ड क्लोराइड है। सोने के लवणों से बहुत-से उपयोगी पदार्थ तैयार किए जाते हैं। इनमें से एक *पर्पल ऑफ कैसियस* कहलाता है। यह पदार्थ काँच की चूड़ियों और पोर्सिलिन को गहरा लाल रंग देने के काम आता है।

प्रयोग 5.

एक परखनली में गोल्ड क्लोराइड का थोड़ा-सा तनु घोल लीजिए। इसमें थोड़ा-सा स्टेनस क्लोराइड और कुछ स्टैनिक क्लोराइड डालिए। इस पर आप गहरे नील लोहित अवक्षेप देखेंगे। इसी को *पर्पल ऑफ कैसियस* कहते है।

4.5 चाँदी

चाँदी एक और परिचित धातु है। यह भी मूल्यवान धातु होती है किन्तु सोने के समान उत्कृष्ट नही। वायु से यह काली पड़ जाती है और अम्लों का भी इस पर प्रभाव होता है—प्राचीन काल से लोग चाँदी को जानते थे और जिन प्रयोगो के लिए सोना काम आता है उन्ही के लिए चाँदी का इस्तेमाल किया जाता है।

4.6 चाँदी की प्राप्ति और उत्पादन

चाँदी प्राकृतिक अथवा शुद्ध अवस्था में मैक्सिको और नार्वे में मिलती है। यह अपने यौगिकों के रूप में भी पाई जाती है जो प्रायः क्लोराइड (हार्न सिल्वर) और सल्फाइड (अर्जेनटाइट) होते हैं। जिस प्रकार सोना पारद-धातु मिश्रण प्रक्रिया और सायनाइड प्रक्रिया द्वारा तैयार किया जाता है, उसी प्रकार चाँदी का भी उत्पादन होता है। यह वैद्युत अपघटन द्वारा शुद्ध की जाती है।

4.7 चाँदी के गुण और उपयोग

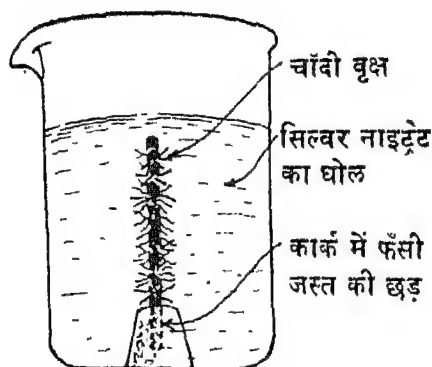
शुद्ध चाँदी भारी और श्वेत ठोस पदार्थ है, जिसमें चमक होती है। यह अत्यन्त तन्य और आघातवर्ध्य होती है। यह ऊष्मा और विद्युत की सबसे अच्छी चालक है। इस पर बहुत अधिक पालिश की जा सकती है। यह काली भी पड़ जाती है अर्थात ऐसी वायु के संपर्क में आने से, जिसमें हाइड्रोजन सल्फाइड का संदूषण हो। चाँदी की पन्नी द्वारा इस बात को दिखाया जा सकता है। इस पर जल, क्षारों और अधिकांश अम्लों का प्रभाव नही होता। नाइट्रिक एसिड में यह बहुत शीघ्र घुल जाती है और इससे सिल्वर नाइट्रेट बनता है जो कि चाँदी का सबसे महत्वपूर्ण लवण है।

चाँदी के लवणों के घोलों में जस्त द्वारा चाँदी को विस्थापित कर दिया जाता है क्योंकि यह अधिक अभिक्रियाशील होता है। चाँदी के लवणों में से चाँदी निकालने के लिए इस गुण का प्रयोग किया जाता है।

प्रयोग 6. रजत वृक्ष (सिल्वर ट्री) का बनाना

जैसा कि चित्र-43 में दिखाया गया है एक ऐसे बीकर में साधारण सांद्रण का थोड़ा-सा सिल्वर नाइट्रेट का घोल लीजिए, जिस बीकर की तली में एक डाट में जस्त की एक छड़ी लगी हो। एक घंटे के बाद आप देखेंगे कि छड़ के चारों ओर चाँदी के रवे एक सुंदर पेड़ की शक्ल में जमा हो जाएँगे। इसे *रजत वृक्ष* या *सिल्वर ट्री* कहते हैं।

चाँदी से धातु मिश्रण (अलाय) भी बनते हैं। यह पारे में घुल जाती है और इससे पारद-रजत धातु मिश्रण बनता है। जब इस अमलगम को गर्म किया जाता है तो पारा आसवित होकर निकल



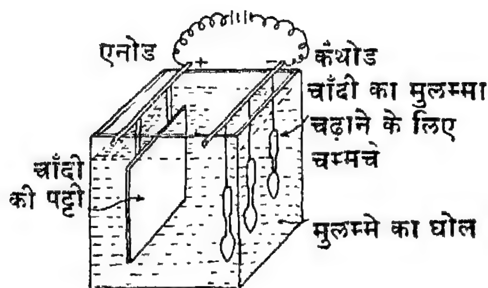
चित्र 43. रजत वृक्ष (जस्त द्वारा चाँदी का विस्थापन)

जाता है और चाँदी बच रहती है। चाँदी का ऑक्साइड भी होता है जो क्षारकीय होता है। किन्तु बहुत गर्म करने पर यह चाँदी और ऑक्सीजन में अपघटित हो जाता है।

चाँदी मुख्यत: आभूषण बनाने के काम आती है। इसके अलावा इसके सिक्के और बर्तन भी बनाते है। चाँदी का मुलम्मा चढ़ाने के लिए सिल्वर नाइट्रेट का प्रयोग किया जाता है।

प्रयोग 7. ताँबे या पीतल की वस्तुओं पर चाँदी का मुलम्मा चढ़ाना।

वैद्युत अपघटन ऊष्मक में थोड़ा-सा सिल्वर नाइट्रेट घोल लीजिए जिसमें पोटासियम सायनाइड का आधिक्य हो। पोटासियम सिल्वर सायनाइड का यह घोल विद्युत अपघट्य बन जाता है। जिस वस्तु पर चाँदी चढ़ानी होती है उसे विद्युत अपघट्य मे लटका देते हैं और यह कैथोड बन जाता है। ऊष्मक में दूसरी ओर शुद्ध चाँदी की एक प्लेट लटका दी जाती है जो चित्र-44 की तरह एनोड बन जाती है। इसके बाद बिजली की धारा छोड़ दीजिए। आप देखेंगे कि वस्तु पर चाँदी का मुलम्मा चढ़ जाएगा।



चित्र 44. चाँदी का मुलम्मा चढ़ाना

सिल्वर नाइट्रेट और अमोनियम क्लोराइड तथा अमोनियम ब्रोमाइड की अभिक्रिया से सिल्वर हैलाइड बनते हैं जो कि फोटोग्राफी में काम आते हैं।

प्रयोग 8.

एक परखनली में थोड़ा-सा सिल्वर नाइट्रेट का घोल लीजिए। इसमें अमोनियम ब्रोमाइड का कुछ घोल डालिए। उस पर आपको सिल्वर ब्रोमाइड का पीलापन लिए सफेद रंग का अवक्षेप दिखाई देगा। अवक्षेप के कुछ भाग को प्रकाश के लिए प्रभाव्य रखिए। आप देखेंगे कि यह गहरे धूसर रंग का हो जाएगा। अवक्षेप के दूसरे भाग की सोडियम थायोसल्फेट से अभिक्रिया कीजिए जो *हाइपो* के नाम से भी जाना जाता है। आप देखेंगे कि *हाइपो* के घोल में अवक्षेप घुल जाएगा। सिल्वर ब्रोमाइड के यही गुण इसे फोटोग्राफी में उपयोगी बना देते हैं।

4.8 ताँबा

ताँबा एक और सामान्य धातु है। इसका भी अत्यन्त प्राचीन काल से मनुष्य इस्तेमाल करता रहा है। ताँबे और रांगे के मेल से बनी कांस्य

Bronze) का बहुत-सा सामान बनता है और हुत लोग उसका इस्तेमाल करते थे।

[.9 ताँबे की प्राप्ति और उत्पादन

शुद्ध धातु के रूप में ताँबा अमरिका में बड़ी ात्रा में मिलता है। यद्यपि यह अपने ऑक्साइडों ौर कार्बनेटों के रूप में भी मिलता है किन्तु ताँबे ा सबसे सामान्य स्रोत इसका सल्फाइड होता है ासे कॉपर पाइराइट कहते हैं। ऑक्साइडों और ार्बनेटों में रो शुद्ध ताँबा धातु ऑक्साइडों और ार्बनेटों को कार्बन (कोक) के साथ गर्म करने : प्राप्त होता है। पाइराइटों का किसी काम के लए प्रयोग करना बहुत कठिन है और इसका योग करने के लिए और धातु का उत्पादन करने ; लिए विशेष अभिक्रिया की आवश्यकता पड़ती : ।

विद्युत अपघटन द्वारा धातु शोधी जाती है।

4.10 ताँबे के गुण और उपयोग

ताँबा एक भारी, लाल रंग की धातु होती है। इसमें काफी चमक रहती है। यह बहुत तन्य तथा आघातवर्ध्य होती है। इसी गुण के कारण इससे बहुत ातले तार और पत्नी तैयार की जा सकती है। बिजली और ऊष्मा की भी यह धातु अच्छी चालक है। सोने और चाँदी से यह कम उत्कृष्ट होती है और इसी कारण यह नम वायु में जल्दी ही संक्षारित हो जाती है। संक्षारण से हल्के हरे रंग का एक विपैला यौगिक बनता है जिसे *वर्डीग्रिस* कहते हैं। चाँदी की तरह ताँबा भी बहुत से रसायनों के लिए प्रतिरोधी होती है। फिर भी नाइट्रिक एसिड और गर्म सांद्रित सल्फ्यूरिक एसिड (गंधक के तेजाब) में यह धातु घुल जाती है और इससे लवण बनते हैं। ताँबे के लवणों में कॉपर सल्फेट (तूतिया) सबसे अधिक महत्वपूर्ण होता है जिसका उल्लेख अध्याय-5 में किया गया है। लोहे द्वारा ताँबे के लवणों के घोल में से ताँबा विस्थापित कर दिया जाता है क्योंकि लोहा अधिक अभिक्रियाशील होता है। (देखिए प्रयोग 2)। ताँबे के दो ऑक्साइड बनते है, एक काला जो अधिक सामान्य होता है और दूसरा लाल। ताँबे के ऑक्साइड क्षारकीय होते हैं और अम्लों में घुल जाते हैं जिससे लवण बनते हैं। ताँबे से भी धातु मिश्रण और पारद-धातु मिश्रण बनते हैं। ताँबे के कुछ महत्वपूर्ण धातु मिश्रण (अलाय) हैं: कांस्य (ताँबा+राँगा), *पीतल* (ताँबा+जस्त) और *जर्मन सिल्वर* (ताँबा+जस्त+निकल)।

विद्युत उद्योग में ताँबे का बहुत प्रयोग होता है। इसके अलावा इसके सिक्के और भभके भी बनते हैं।

4.11 राँगा या टिन

प्रागैतिहासिक काल से मनुष्य टिन या राँगे से परिचित है। इस धातु का सबसे महत्वपूर्ण स्रोत इसका ऑक्साइड है, जिसे *टिन-स्टोन* कहते हैं जिसे कोक के साथ अपचयन करके धातु निकाली जाती है।

4.12 राँगे के गुण और उपयोग

टिन या राँगा चाँदी की तरह सफेद चमकदार धातु होती है। यह कोमल और आघातवर्ध्य होती है और इसकी पन्नी आम चीज है। वायु और जल का इस पर प्रभाव नहीं होता किन्तु यह क्षारों और अम्लों में घुल जाती है जिससे हाइड्रोजन और लवण बनते हैं।

टिन वायु या ऑक्सीजन में जल जाती है और इससे ऑक्साइड बनते है जो क्षारकीय होते

हैं। इसके ऑक्साइड अम्लों में घुल जाते हैं जिससे लवण बनते हैं। इन लवणों में से स्टैनस क्लोराइड सबसे महत्वपूर्ण होता है। लोहा राँगे के लवणों के घोल में से राँगे को विस्थापित कर देता है।

प्रयोग 9.

स्टैनस क्लोराइड का सांद्रित घोल एक बीकर में लेकर उसमे लोहे के कुछ तार डालिए। आप देखेंगे कि तारों पर सफेद चमकदार मुलम्मा चढ जाएगा। यह तार पिनें बनाने के काम आते हैं।

टिन बहुत उपयोगी धातु है। ताँबे और लोहे की चीजों पर टिन का मुलम्मा चढ़ाने में यह बहुत काम आती है और इससे पन्नी भी बनती है। इससे कई उपयोगी अलाय जैसे कांस्य और मुलायम टाँका (सीसा+राँगा) बनते हैं। यह पारद में घुल जाती है और इससे जो अमलगम बनता है उसे *टिन अमलगम* कहते है।

4.13 सीसा

प्रकृति में सीसा शुद्ध रूप से नहीं मिलता। यह मुख्यत: सल्फाइड के रूप में मिलता है जिसे *गैलेना* कहते हैं। इससे सीसा प्राप्त करने के लिए पहले सल्फाइड को भूना जाता है और फिर इसका अपचयन किया जाता है।

4.14 सीसे के गुण और उपयोग

सीसा भारी, चमकदार, नीले-(धूसर) रंग की धातु होती है। वह काफी मुलायम होती है और इसे चाकू से काटा जा सकता है। इससे कागज पर काला निशान पड़ जाता है। यह तन्य और आघातवर्ध्य होती है। यह ऊष्मा और विद्युत की चालक है। वायु और बहुत से अम्लों की यह प्रतिरोधक है, किन्तु नाइट्रिक एसिड में तुरंत घुल जाती है। इससे लैड नाइट्रेट बनता है जो सीसे का सबसे महत्वपूर्ण लवण होता है। लैड एसिटेट इसका एक और महत्वपूर्ण लवण होता है। सीसे के बहुत से ऑक्साइड बनते हैं, जिनमें से अधिकांश अम्लों में घुल जाते है और घुलने पर जो लवण बनते है वे क्षारकीय होते हैं। सीसे के लवण विषैले होते है। सीसे के नमूने आसानी से मिल जाते हैं और इनकी सहायता से इसके गुणों का अध्ययन किया जा सकता है।

नल (पाइप), बिजली के तारों के आच्छद, संचायक सैलो की प्लेटों और गंधक अम्ल (सल्फ्यूरिक एसिड) बनाने के काम में आने वाले कक्ष (चैम्बरों) में सीसे का काफी प्रयोग होता है। इससे कई उपयोगी अलाय या धातु मिश्रण बनते हैं और पारे के साथ एक अमलगम भी बनता है। अलायों में से कुछ *मुद्रण धातु* (सीसा+एन्टीमनी+टिन) और मुलायम टाँका (सीसा+टिन) बनाने के काम आती है।

4.15 पारा

पारद या पारा भी एक ऐसी ही धातु है जो बहुत प्राचीन काल से मनुष्य को ज्ञात है। यहाँ यह जानना भी अच्छा होगा कि प्राचीन काल में हिन्दू लोग पारद के यौगिकों से बहुत-से रोगों की चिकित्सा करते थे।

पारे का मुख्य स्त्रोत इसका एक सल्फाइड है जिसे लाल *सिंगरफ* या *सिनाबार* कहते हैं, और जो स्पेन में मिलता है। सिनाबार को वायु में भून कर इससे धातु निकाली जाती है। सल्फाइड पहले ऑक्साइड में बदलता है और फिर इसका

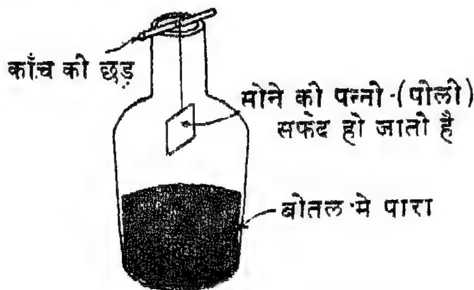
अपघटन शुद्ध धातु और ऑक्सीजन में होता है।

4.16 पारद के गुण और उपयोग

पारद ही केवल ऐसी ज्ञात धातु है जो तरल होती है। अध्ययन के लिए यह आसानी से मिल जाती है। यह सफेद रंग की होती है और इसमें बड़ी चमक होती है। यह बहुत भारी होती है और इसका विशिष्ट घनत्व 13·6 है। ऊष्मा और विद्युत की यह अच्छी चालक है। इसी कारण यह वायु दाबमापी (बैरोमीटर), तापमापी (थर्मामीटर) और दाबांतरमापी (मैनोमीटर) जैसे यंत्रों में इस्तेमाल की जाती है। सामान्य तापमान पर इस धातु से वाष्प निकलती है। पारद की वाष्प अत्यन्त विषैली होती है, इसलिए इसे खुले डिब्बों या बर्तनों आदि में नही रखना चाहिए।

प्रयोग 10.

डाट लगी हुई बोतल में थोड़ा-सा पारा लीजिए। जैसा कि चित्र-45 में दिखाया गया है, पारे के ऊपर सोने की एक पतरी लटकाइए। आप देखेंगे कि धीरे-धीरे यह पतरी सफेद हो जाएगी। इससे यह पता चलता है कि सामान्य तापमानों पर भी पारद में से वाष्प निकलती है और सोने की पतरी पर जम जाती है जिससे पतरी का रंग पीले से सफेद हो जाता है।



चित्र-45. पारद से वाष्प निकलती है

वायु, जल और क्षारों का पारे पर कोई प्रभाव नहीं होता। फिर भी इसे 360 डिग्री सें० पर गर्म किया जाए तो ऑक्सीजन से मिल कर पारे का लाल ऑक्साइड बन जाता है जिसे *मरक्यूरिक ऑक्साइड* कहते हैं। जब इस ऑक्साइड को और अधिक तापमान पर गर्म किया जाता है तो यह पारद और ऑक्सीजन में अपघटित हो जाता है। ऑक्साइड अम्लो में घुल जाता है जिससे लवण बनते हैं और इस कारण ये क्षारकीय होते हैं।

हाइड्रोक्लोरिक एसिड और तनु सल्फ्यूरिक एसिड का पारे पर कोई प्रभाव नहीं होता। गर्म सांद्रित सल्फ्यूरिक एसिड और नाइट्रिक एसिड में पारा घुल जाता है और इससे संगत लवण (सल्फेट और नाइट्रेट) बनते है। मरक्यूरस क्लोराइड को *कैलोमल* और मरक्यूरिक क्लोराइड को *कोरोसिव सब्लीमेट* कहते हैं। ये दोनों पारद के महत्वपूर्ण लवण है जिनका औषधियों में प्रयोग होता है। पारे के सभी लवण जहरीले होते हैं और इस कारण इनके इस्तेमाल में सावधानी बरतनी चाहिए।

4.17 ऐल्युमिनियम

यद्यपि ऐल्युमिनियम शुद्ध रूप में नहीं मिलता किन्तु यौगिकों के रूप में यह बहुत व्यापक परिमाण मे बिखरा हुआ मिलता है। उदाहरण के लिए साधारण मिट्टी में ऐल्युमिनियम सैलीकेट होता है। फिर भी ऐल्युमिनियम का मुख्य स्रोत इसका ऑक्साइड है जिसे *बॉक्साइड* कहते हैं। शुद्ध किए हुए बॉक्साइड को विद्युत द्वारा अपघटित करके ऐल्युमिनियिम निकाला जाता है। शुद्ध ऐल्यु-मिनियम कैथोड पर जमा होता है। ऐल्युमिनियम के निर्माण की यही विधि है।

4.18 ऐल्युमिनियम के गुण और उपयोग

ऐल्युमिनियम बहुत रूपों में मिलता है। ऐल्युमिनियम सफेद धातु है, जिसमें चमक होती है। यह बहुत हल्की, तन्य और आघातवर्ध्य धातु है। बिजली और ऊष्मा की भी यह चालक होती है। जल और वायु की क्रिया की यह प्रतिरोधक है। 100 डिग्री सें० पर ऐल्युमिनियम का चूर्ण जल को अपघटित कर देता है, जिससे हाइड्रोजन निकलती है।

ऐल्युमिनियम हाइड्रोक्लोरिक और सल्फ्यूरिक एसिडों में घुल जाता है जिससे संगत लवण (क्लोराइड और सल्फेट) बनते है। यह ऑक्सीजन में जलती है जिसमें ऑक्साइड बनते हैं जो अम्लों में घुल कर लवण बनाते हैं और इस कारण यह लवण क्षारकीय होते है। ऐल्युमिनियम के सबसे महत्वपूर्ण लवण ऐल्युमिनियम क्लोराइड, ऐल्युमिनियम सल्फेट और फिटकरी होते है। ऐल्युमिनियम के बहुत-से उपयोग है। खाना बनाने के हर प्रकार के बर्तन ऐल्युमिनियम से बनते हैं। रंग-रोगन, उद्योग में ऐल्युमिनियम का चूर्ण इस्तेमाल होता है। विद्युत उद्योग में ऐल्युमिनियम के तार काम आते है।

कुछ उपयोगी धातु मिश्रण अर्थात अलाय भी ऐल्युमिनियम से बनते है। इसमें से कुछ महत्वपूर्ण हैं; मैग्नेलियम, (मैग्नीसियम+ऐल्युमिनियम), *ऐल्युमिनियम कांस्य* (90–98 प्रतिशत *कांस्य*+ 2-10 प्रतिशत ऐल्युमिनियम) और ड्यूरलुमिन (ऐल्युमिनियम+ताँबा+मैग्नीसियम और मैंगेनीज की सूक्ष्म मात्रा)। यह अलाय वायुयान बनाने तथा बाइसिकिल के पुर्जे बनाने के काम आते हैं।

4.19 लोहा

यद्यपि प्रायः सभी उल्का पिंडों में शुद्ध लोहा मिलता है किन्तु प्रकृति में लोहा शुद्ध रूप में नहीं पाया जाता है। यह प्रायः ऑक्साइड, कार्बोनेट और सल्फाइड के रूप में मिलता है। लोहा मुख्यतः हैमेटाइट नामक ऑक्साइड से निकाला जाता है। इसके लिए ऑक्साइड को चूने के पत्थर और कोक के साथ मिलाकर *झोंका भट्टी* नामक एक विशेष भट्टी में गर्म किया जाता है। पिघले हुए लोहे को रेत के बने हुए साँचों में जमा किया जाता है। इस प्रकार बने हुए लोहे को *ढलवाँ लोहा*, या *कच्चा लोहा* कहते हैं। यह लोहा भंगुर होता है। विशेष विधियों द्वारा कच्चे लोहे को *पिटवाँ लोहे* में बदला जाता है जो आघातवर्ध्य होता है। कच्चे लोहे को इसी प्रकार इस्पात में परिवर्तित किया जाता है जो कठोर और सशक्त होता है। इन तीनों प्रकार में कार्बन की मात्रा भिन्न-भिन्न होती है। सामान्य लोहा नम वायु में जंग पकड़ लेता है। किन्तु आजकल हम लोग जंगरोधी इस्पात अर्थात स्टेनलेस स्टील से परिचित हैं, जिस पर जंग नहीं लगती और जिसका बहुत से कामों के लिए प्रयोग किया जाता है, विशेष रूप से खाना पकाने के बर्तनो में। इस्पात में निश्चित मात्रा में क्रोमियम और निकिल मिलाकर जंगरोधी इस्पात तैयार किया जाता है।

4.20 लोहे के गुण और उपयोग

लोहा सामान्यतः बहुत-से रूपों में मिलता है। यह धूसर से सफेद रंग की धातु है। यह तन्य और आघातवर्ध्य है। किन्तु लोहे का यह गुण कार्बन और अन्य अशुद्धताओं के अनुसार बदलता रहता है। लोहा ऊष्मा और विद्युत का चालक है।

ऑक्सीजन के साथ मिल कर लोहे का ऑक्साइड बनता है। यह ऑक्साइड अम्लों में घुल कर लवण बनाता है जो क्षारकीय होते हैं। हाइड्रोक्लोरिक

एसिड और सल्फ्यूरिक एसिड में लोहा घुल जाता है जिससे संगत लवण (क्लोराइड और सल्फेट बनते हैं। लोहे से दो प्रकार के लवण बनते हैं जो फेरस और फैरिक लवण कहलाते हैं। इन सबमें सबसे अधिक महत्वपूर्ण फेरस सल्फेट और फैरिक क्लोराइड है जो प्रयोगशाला में अभिकर्मक की भाँति काम आते हैं। लोहा बहुत ही उपयोगी धातु है और बहुत से उद्योग इसी पर आधारित हैं। सभी प्रकार की मशीनरी, लोहे की छड़ें, गर्डर, चादरें आदि बहुत-सी चीजें लोहे से बनती हैं। इस्पात का प्रयोग युद्ध पोतों और टैंकों की आर्मर प्लेटें बनाने मे किया जाता है। जंगरोधी इस्पात से हर प्रकार के बर्तन बनते हैं। उच्च कोटि की चाकू, छुरियाँ आदि भी इसीसे बनती हैं।

संक्षेप

धातुएँ मूलतत्व हैं। वे ऑक्साइड बनाती हैं जो क्षारकीय होते हैं।

धातुओं में केवल पारद ही तरल होती है। अन्य धातुएँ ठोस होती हैं।

सोना उत्कृष्ट धातुओं में से एक है। इस पर सामान्य अम्लों और क्षारों का प्रभाव नहीं होता। फिर भी यह एक्वारेगिया में घुल जाता है और वायु की उपस्थिति में पोटासियम सायनाइड में घुल जाता है। अन्य धातुएँ अकार्बनिक खनिज अम्लों में घुल जाती हैं।

धातुएँ आमतौर से आघातवर्ध्य और तन्य होती हैं अर्थात उन्हें हथोड़े से पीटकर चादरों या पन्नी के रूप में बढ़ाया जा सकता है या खींचकर उनके तार बनाए जा सकते हैं। वे बिजली और ऊष्मा की चालक होती हैं और साधारणतया भारी होती हैं। सबसे अच्छी चालक चाँदी होती है और उसके बाद ताँबा।

अम्लों के साथ अभिक्रिया द्वारा धातुएँ लवण बनाती हैं।

धातुओं को जब वायु या ऑक्सीजन में गर्म किया जाता है तो उनसे ऑक्साइड बनते हैं।

लोहा, तीन रूपों में इस्तेमाल किया जाता है; कच्चा या ढलवाँ लोहा, पिटवाँ लोहा और इस्पात।

चाँदी, पारा, राँगा (टिन) और ऐल्युमिनियम सफेद होते हैं।

सोना पीला होता है। ताँबा लाल होता है। सीसा नीला-धूसर होता है। लोहा भूरा-धूसर सफेद होता है।

अलाय या धातु-मिश्रण दो या अधिक धातुओं का समांगी मिश्रण है।

अलाय शुद्ध धातुओं की अपेक्षा अधिक उपयोगी होती है।

अमलगम किसी धातु के पारद के साथ धातु-मिश्रण को कहते हैं।

प्राकृतिक स्रोतों से शुद्ध धातुओं को पृथक करने के विज्ञान को धातु-कर्म कहा जाता है।

दोहराने के लिए प्रश्न

1. धातुएँ क्या होती हैं ? अधातुओं से वे किस प्रकार भिन्न होती हैं ।
2. कुछ सामान्य धातुओं के नाम दीजिए । वे देखने में कैसी लगती हैं ? धातुओं के कुछ अभिलक्षणिक गुण बताइए ।
3. सोना और चाँदी उत्कृष्ट धातु क्यों कहलाती हैं ?
4. पारे के गुण और उपयोग बताइए।
5. कुछ ऐसी सामान्य धातुओं के नाम बताइए जो प्रकृति के रूप में अर्थात मूलतत्व के रूप में ही पाई जाती है ।
6. कुछ ऐसी धातुओं के नाम बताइए जो शुद्ध नहीं मिलती बल्कि संयुक्त रूप में मिलती हैं ।
7. लोहे की व्यापारिक किस्में कौन-सी हैं ? इनमें क्या अंतर होता है ?
8. जब ऐसा होता है तो आपको क्या दिखाई देता है :

   क) जस्त को सिल्वर नाइट्रेट के घोल में रखा जाता है ।

   ख) सोने को पारद में डुबाया जाता है और बाद मे गर्म किया जाता है ।

   ग) धातु के तार के सिरे को बैटरी से जोड़ दिया जाता है ।

अध्याय 5

कुछ सामान्य लवण

5.1 लवण क्या होते हैं ?

रासायनिक यौगिक दो या अधिक रासायनिक मूलतत्वों के संयोग से बनते हैं। इनमें से कुछ मूलतत्व जैसे सोडियम, पोटासियम और कैल्सियम ऑक्सीजन से मिलकर सोडियम ऑक्साइड, पोटासियम ऑक्साइड और कैल्सियम ऑक्साइड बनाते हैं। कैल्सियम ऑक्साइड को चूना भी कहते हैं और इसे एक प्रारूपिक उदाहरण माना जा सकता है। यह ऑक्साइड प्रकृति से क्षारकीय होते हैं और पानी में घुल जाते हैं, जिससे सोडियम हाइड्रॉक्साइड, पोटासियम हाइड्रॉक्साइड, तथा कैल्सियम हाइड्रॉक्साइड बनते हैं। इनके जलीय घोलों से लाल लिटमस नीला हो जाता है। ये पदार्थ *क्षारक* या *अम्ल* कहलाते है।

दूसरी ओर नाइट्रोजन, सल्फर (गंधक), कार्बन और फॉस्फोरस जैसे मूलतत्व ऑक्सीजन के साथ अभिक्रिया द्वारा नाइट्रोजन पैन्टाक्साइड, सल्फर डाइआक्साइड, कार्बन डाइआक्साइड और फॉस्फोरस पैन्टाक्साइड बनाते हैं, जिन्हें प्रारूपिक उदाहरण माना जा सकता है। इन ऑक्साइडों के गुण अम्लीय होते हैं। ये पानी में घुल जाते है, जिससे क्रमश: नाइट्रिक एसिड, सल्फ्यूरस एसिड, कार्बोनिक एसिड, और फॉस्फोरिक एसिड बनते हैं। इनके जलीय घोलों से नीला लिटमस लाल हो जाता है। एक अन्य महत्वपूर्ण अम्ल हाइड्रोक्लोरिक एसिड है। यह हाइड्रोजन और क्लोरीन के मेल और फिर दोनों के पानी में घुलने से बनती है।

इस प्रकार रासायनिक यौगिक दो प्रकार के होते हैं; जैसे सोडियम हाइड्राक्साइड, पोटासियम हाइड्राक्साइड और कैल्सियम हाइड्राक्साइड जैसे क्षारक और नाइट्रिक एसिड, सल्फ्यूरस एसिड, कार्बोनिक एसिड, फॉस्फोरिक एसिड और हाइड्रोक्लोरिक एसिड जैसे अम्ल। जब कोई क्षारक किसी अम्ल से अभिक्रिया करता है तो एक तीसरा रासायनिक यौगिक बन जाता है, जिसे *लवण* कहते हैं। इस अभिक्रिया को *उदासीनीकरण* की क्रिया कहा जाता है।

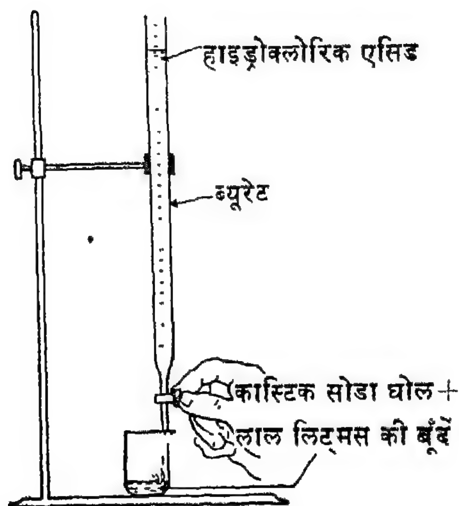
प्रयोग 1. लवणों का उदासीनीकरण और निर्माण

एक बीकर में लगभग 10 घन सीसी (cc) सोडियम हाइड्राक्साइड का घोल लीजिए। चित्र-46 की भाँति थोड़ा-सा तनु हाइड्रोक्लोरिक एसिड घोल ब्युरेट में

इस अध्याय में प्रतीक (सिम्बल) और सूत्र (फार्मूला) का उपयोग केवल सुविधा के लिए प्रारंभ किया गया है। इनका पूर्ण महत्व और उपयोग अध्याय 7 में बताया गया है।

डालिए जो कि सीधा खड़ा किया हुआ हो। बीकर में लाल लिटमस घोल की दो बूंदें छोड़िए। आप देखेंगे कि लाल रंग नीले में बदल जाता है। अब ब्यूरेट में से बूंद-बूंद करके अम्ल छोड़िए। और तब तक छोड़ते जाइए जब तक कि नीला रंग बस लाल हो जाए। इस समय क्षारक को अम्ल द्वारा उदासीनीकृत कहा जाता है। इसे वाष्पन द्वारा सुखाकर जो अवशेष बचेगा वह सामान्य या खाने का नमक होगा। इस अवशेष को पानी में घोलिए। आप देखेंगे कि इस घोल का लिटमस पर कोई प्रभाव नहीं होता। *अतः लवण लिटमस के लिए उदासीन है।*

प्रकृति में बहुत से लवण पाए जाते हैं और बहुत दृष्टियों से वे बहुत महत्व रखते हैं। भिन्न-भिन्न धातुओं के ये लवण क्लोराइड, सल्फेट नाइट्रेट और कार्बोनेट होते हैं।



चित्र–46. *लवण के निर्माण के लिए उदासीनीकरण*

कुछ सामान्य प्रारूपिक लवण

5.2 नमक का सोडियम क्लोराइड (NaCl)

नमक प्रकृति में व्यापक रूप में मिलता है। समुद्र जल मे यह भारी परिमाण में होता है और नदियों के जल में नगण्य परिमाण में। भारत में राजस्थान की सांभर झील में बहुत नमक मिलता है और यह नमक का मुख्य स्रोत है। पृथ्वी के भीतर खनिज के रूप मे भी नमक या साधारण लवण मिलता है। ऐसे नमक को *सैंधा नमक* या *राक साल्ट* कहते हैं। पाकिस्तान के खेवड़ा नामक स्थान में इस नमक की बहुत बड़ी खान है और हिमाचल प्रदेश में मंडी में भी छोटी-सी खान है।

अधिकांश नमक समुद्र जल का वाष्पन करके प्राप्त होता है। सैंधा नमक या राक साल्ट नमक की खानों में विस्फोट करके या बड़े-बड़े ढेलों को तोड़कर निकाला जाता है। जहाँ भूगर्भ में नमक की खानें होती हैं वहाँ प्रायः नमक की परतों में पानी पहुँचा कर और उसमें नमक को घोलकर बाहर निकाला जाता है। इस प्रकार जो खारा पानी भीतर से पंपों द्वारा निकलता है उसे वाष्पित करके नमक बनाते हैं।

सौलर नमक समुद्र जल या खान में से निकले हुए खारी पानी को चट्टान या मिट्टी की क्यारियों में वाष्पित करके बनाया जाता है। इन क्यारियों को कड़ाह या पैन कहते हैं। सांद्रित खारे पानी या लवण जल में से नमक रवे के रूप में निकल आता है। इसे जमा करके सुखा देते हैं। यही कच्चा नमक होता है। कच्चे नमक को विशेष विधियों द्वारा शुद्ध किया जाता है जिनका आगे चलकर उल्लेख किया गया है।

5.3 नमक या सोडियम क्लोराइड के गुण और उपयोग

शुद्ध नमक या सामान्य लवण सफेद रवेदार ठोस पदार्थ है जो पानी में घुल जाता है ।

प्रयोग 2.

एक परखनली में थोड़ा-सा नमक लेकर उसे गर्म कीजिए । आप देखेंगे कि नमक के रवों के टूटने से चटचटाने की आवाज आएगी । यह आवाज रवों या क्रिस्टलों के टूटने से निकलती है । इस बात को *कड़कड़ाना* कहते हैं । लवण ऊष्मा से अपघटित नही होता ।

प्रयोग 3.

चित्र-47 की भाँति उपकरण को जमाइए । इसमें एक बैटरी, बिजली का छोटा-सा बल्ब और एक बीकर में नमक का घोल ले लीजिए । बिजली के सरकिट में एक 'की' (key) भी रहनी चाहिए । अब बिजली की धारा छोड़ दीजिए । आप देखेंगे कि बिजली का बल्ब जलेगा जिससे यह प्रकट होगा कि बिजली की धारा घोल में से गुजर रही है । नमक जैसे पदार्थ जिनके घोल (अथवा संलीन अवस्था) में से विद्युत धारा प्रवाहित होती है उन्हें *विद्युत अपघट्य* कहते हैं ।

नमक का घोल विद्युत धारा को क्यों प्रवाहित होने देता है ? नमक के दो भाग होते हैं, जिन्हें 'आयन' कहा जाता है । एक भाग सोडियम आयन (Na^+) होता है जिसमें विद्युत का धनात्मक चार्ज (positive charge) होता है और दूसरे में क्लोराइड आयन (Cl^-) होता है जिसमें ऋणात्मक चार्ज (negative charge) होता है। दोनों आयन विद्युत-विरोधी चार्जों के परस्पर आकर्षण से एक-दूसरे-से जुड़े रहते हैं । जब लवण पानी में घुल जाता है तो आकर्षण की शक्तियाँ टूट जाती हैं और आयन अलग-अलग हो जाते है । घोल में यही आयन विद्युत धारा को बहने में सहायता देते हैं । बहुत-से लवण ऐसा ही व्यवहार करते हैं ।

नमक एक अपघट्य है । अन्य बहुत से नमकों में यह गुण होता है ।



चित्र 47. *आयनन और चालकता*

प्रयोग 4.

एक परखनली में थोड़ा-सा सोडियम क्लोराइड (नमक) लीजिए । इसमें कुछ सांद्रित सल्फ्यूरिक एसिड डालिए और इस मिश्रण को गरम कीजिए । आप देखेंगे कि एक रंगहीन और तीखी गैस निकलेगी । यह हाइड्रोजन क्लोराइड है और यह अम्लीय गैस है । यह गीले और नीले लिटमस कागज को लाल कर देती है ।

सब अम्लों से नीला लिटमस लाल हो जाता है । क्षार लाल लिटमस को नीला कर देते हैं । नमक लिटमस के लिए उदासीन होता है ।

प्रयोग 5.

एक परखनली में आसुत जल में नमक घोलिए।

इसमें थोड़ा-सा सिल्वर नाइट्रेट घोल मिलाइए। आप देखेंगे कि सिल्वर क्लोराइड का सफेद अवक्षेप बन जाएगा।

सोडियम क्लोराइड + सिल्वर नाइट्रेट → सिल्वर क्लोराइड (सफेद अवक्षेप) + सोडियम नाइट्रेट।

सोडियम नाइट्रेट घोल में रह जाता है। यह क्लोराइड आयन (Cl^-) की विशिष्ट अभिक्रिया या परीक्षा है।

प्रयोग 6.

एक वाच-ग्लास में थोड़ा-सा सोडियम क्लोराइड लेकर उसे शुद्ध सांद्रित हाइड्रोक्लोरिक एसिड से तर कीजिए। एक प्लेटिनम तार लेकर उसे इसमें डुबाकर अदीप्त बुन्सन ज्वाला में रखिए और ज्वाला के रंग की ओर ध्यान दीजिए। यह बहुत ही गहरे पीले रंग की हो जाएगी। यह ज्वाला सोडियम और सोडियम के सब लवणों की परीक्षा अभिलक्षण है। कुछ अन्य धातुओं के लवणों से भी इसी प्रकार ज्वाला में रखने पर अलग-अलग रंग प्रकट होते हैं। प्रत्येक धातु का भिन्न-भिन्न रंग होता है।

नमक व्यापक रूप में खाना पकाने के काम आता है। अन्य रसायन बनाने में भी यह भारी मात्रा में इस्तेमाल होता है। इसके अलावा खाने और कपड़ा धोने का सोडा, कास्टिक सोडा, क्लोरीन और हाइड्रोक्लोरिक एसिड इसी से बनते हैं। चमड़े और खाद्य उद्योग में भी नमक भारी मात्रा में इस्तेमाल किया जाता है।

5.4 पोटासियम नाइट्रेट (साल्ट पीटर या नाइटर)

यह एक और महत्वपूर्ण नमक लवण है। पोटासियम नाइट्रेट के अणु में सकारात्मक पोटासियम आयन और नकारात्मक नाइट्रेट आयन होता है।

कुछ मिट्टियों के ऊपर नाइटर सफेद उत्फुल्ल ठोस पदार्थ के रूप में प्रकट होता है। इसे एकत्रित करके पानी में घोला जाता है और घोल को छानकर उसमें से क्रिस्टलीकरण द्वारा शुद्ध नाइटर प्राप्त किया जाता है। किन्तु आजकल नाइटर आमतौर से सोडियम नाइट्रेट जिसे चिली साल्टपीटर (chile saltpeter) कहते हैं और पोटासियम क्लोराइड को उचित अनुपात में घोलकर और फिर इस घोल के प्रभाजित क्रिस्टलीकरण द्वारा तैयार किया जाता है।

सोडियम नाइट्रेट + पोटासियम क्लोराइड → पोटासियम नाइट्रेट + सोडियम क्लोराइड

पहले तो सोडियम क्लोराइड बनता है और अलग हो जाता है और उसके बाद नाइटर का क्रिस्टलीकरण होता है। ऐसा बड़ी सरलता से प्रयोगशाला में किया जा सकता है।

5.5 पोटासियम नाइट्रेट के गुण और उपयोग

पोटासियम नाइट्रेट या नाइटर सफेद रवेदार ठोस पदार्थ है जो पानी में घुल जाता है। इसका घोल लिटमस के लिए उदासीन होता है और विद्युत धारा का चालक है। इस प्रकार यह एक विद्युत-अपघट्य है।

प्रयोग 7.

थोड़े-से नाइटर को एक परखनली में अच्छी तरह गर्म कीजिए। आप देखेंगे कि इसका अपघटन होता है और ऑक्सीजन गैस निकलती है जो दहन में सहायक होती है। इसकी परीक्षा जलती हुई लकड़ी की खपची से की जा सकती है।

प्रयोग 8.

एक परखनली में थोड़ा-सा नाइटर लीजिए। इसमें कुछ सांद्रित सल्फ्यूरिक एसिड डालिए और इसे गर्म कीजिए। ऐसा करने पर लाल भूरे रंग की गैस निकलेगी। इसमें थोड़ी-सी ताँबे की रेतनें डालने से गैस और अधिक निकलेगी। यह गैस नाइट्रोजन डाईऑक्साइड (No_2) कहलाती है।

प्रयोग 9.

नाइटर के साथ ज्वाला परीक्षा कीजिए जैसी कि नमक के साथ की थी। आप देखेंगे कि नाइटर से ज्वाला का रंग गुलाबी हो जाएगा। पोटासियम के सभी रंगों की यही विशेषता है।

बारूद और आतिशबाजी, फ्लिट काँच और नाइट्रिक एसिड बनाने में नाइटर काम आता है। गेहूँ और तंबाकू की फसलों के लिए नाइटर उर्वरक के रूप में भी इस्तेमाल किया जाता है।

5.6 कैल्सियम कार्बोनेट, संगमरमर, चूने का पत्थर, खड़िया ($Ca\,Co_3$)

प्रकृति में कैल्सियम कार्बोनेट बहुत-से रूपों में प्राप्त होता है; जैसे संगमरमर, चूने का पत्थर और खड़िया। इसका एक और पारदर्शक तथा रवेदार प्रकार भी पाया जाता है, 'जिसे आइसलैंड स्पार' कहते हैं। यह समुद्री शंखों, मोतियों, और अंडो के छिलकों में होता है।

कैल्सियम कार्बोनेट सफेद अवक्षेप के रूप में उस समय प्राप्त होता है जब चूने के गर्म घोल में से कार्बन डाइआक्साइड गुजारी जाती है।

कैल्सियम हाइड्राआक्साइड + कार्बन डाइआक्साइड → कैल्सियम कार्बोनेट + पानी।

5.7 कैल्सियम कार्बोनेट के गुण और उपयोग

कैल्सियम कार्बोनेट सफेद रंग का ठोस पदार्थ है और नमक से भिन्न इसमें यह बात है कि यह पानी में नही घुलता। ज्वाला परीक्षा करने पर यह ज्वाला को ईंट के रंग का लाल कर देता है और कैल्सियम के लवणों की यही विशेषता है।

प्रयोग 10.

एक परखनली में थोड़ा-सा कैल्सियम कार्बोनेट खूब गर्म कीजिए। आप देखेंगे कि इसका अपघटन हो जाएगा और कार्बन डाइआक्साइड गैस निकलेगी और कैल्सियम आक्साइड बाकी बच रहेगा।

कैल्सियम कार्बोनेट → कैल्सियम ऑक्साइड + कार्बन डाइआक्साइड

इस अभिक्रिया का चूने के पत्थर को भट्टों में गर्म करके बिना बुझा हुआ चूना बनाने में उपयोग किया जाता है।

कैल्सियम ऑक्साइड पानी में घुल जाता है और इसके घोल से लाल लिटमस नीला हो जाता है। जिससे यह स्पष्ट हो जाता है कि यह एक क्षार है।

प्रयोग 11.

एक परखनली में कुछ कैल्सियम कार्बोनेट लीजिए। फिर इसमें तनु हाइड्रोक्लोरिक एसिड डालिए। आप देखेंगे कि कार्बन डाइआक्साइड के निकलने से बुदबुदाहट होगी और कैल्सियम क्लोराइड का घोल तैयार हो जाएगा।

मूर्तियाँ बनाने और वास्तुकला की दृष्टि से संगमरमर सबसे अच्छा माना जाता है। बुझा और बिना बुझा हुआ चूना व सीमेंट आदि बनाने में काम आने वाली चीजें बनाने के लिए चूने का पत्थर काम में लाया जाता है।

5.8 कॉपर सल्फेट ($CuSO_4.5H_2O$)

कॉपर सल्फेट शुद्ध रूप में नहीं मिलता, किन्तु जब तांबा या ब्लैक ऑक्साइड गर्म सांद्रित सल्फ्यूरिक एसिड में घोला जाता है तो यह बड़ी सरलता से तैयार हो जाता है।

कॉपर (या ब्लैक ऑक्साइड) + सल्फ्यूरिक एसिड → कॉपर सल्फेट + पानी।

5.9 कॉपर सल्फेट के गुण और उपयोग

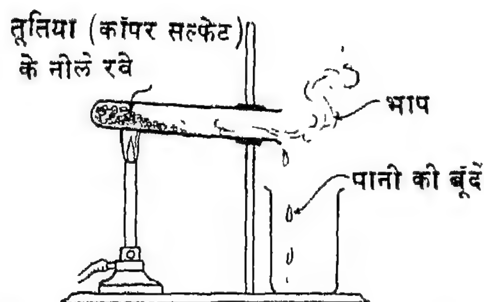
अभी तक जिन लवणों का उल्लेख किया गया है कॉपर सल्फेट उनसे भिन्न नीला, रवेदार ठोस द्रव्य होता है जो पानी में घुल जाता है।

प्रयोग 12.

कॉपर सल्फेट के कुछ रवे लेकर इन्हें कांच की परखनली में खूब गर्म कीजिए। परखनली चित्र-48 की भाँति फिट की हुई होनी चाहिए। आप देखेंगे कि पानी जो भाप बनकर उड़ जाता है और फिर बीकर में ही इकट्ठा कर लिया जाता है। पहले तो नमक अपना नीला रंग खो देता है और अंत में निर्जल कॉपर सल्फेट सफेद चूर्ण के रूप में बच रहता है। परखनली को ठंडा करके इसमें थोड़ा-सा पानी डाल दीजिए। आप देखेंगे कि फिर से नीला रंग आ जाएगा और अधिक पानी के डालने से नीला घोल तैयार हो जाएगा।

कॉपर सल्फेट के क्रिस्टलों में जल रहता है और यह *जलयोजित लवण* कहलाता है। इसका पानी *क्रिस्टलीकरण जल* कहा जाता है।

कॉपर सल्फेट के क्रिस्टलों का नीला रंग जलयोजित होने पर धनात्मक क्यूप्रिक आयन (Cu^{++}) के कारण होता है।



चित्र 48. कॉपर सल्फेट (*नीला थोथा या तूतिया*) के रवे का *निर्जलीकरण*

प्रयोग 13.

एक बीकर में कॉपर सल्फेट का घोल लेकर उसमें जस्त की एक छड़ डालिए। आप देखेंगे कि घोल में से ताँबा विस्थापित होकर जस्त की छड़ पर लाल भूरे रंग की परत की शक्ल में जमा हो जाएगा। लोहे द्वारा भी ताँबा विस्थापित हो जाता है। (देखिए प्रयोग 2, अध्याय 4)।

प्रयोग 14.

कॉपर सल्फेट (तूतिया) की ज्वाला-परीक्षण भी कीजिए। ऐसा करते पर हरे रंग की ज्वाला निकलेगी। यह सब ताँबे के लवणों की विशेषता है।

प्रयोग 15.

एक परखनली में पानी लेकर थोड़ा-सा कॉपर सल्फेट घोलिए। उसमें कुछ बेरियम क्लोराइड का घोल डालिए। ऐसा करने पर सफेद रंग का अवक्षेप बन जाएगा। यह बेरियम सल्फेट का अवक्षेप होगा और यह अम्लों में नहीं घुलता। यह उन सब सल्फेटों की परीक्षा है जो पानी में घुल जाते हैं।

कॉपर सल्फेट ताँबे का मुलम्मा चढ़ाने के काम आता है। यह कपड़ा रंगने और छींट छापने में

रगवर्धक के रूप में इस्तेमाल होता है। यह कीटाणु-नाशी और कवकनाशी के रूप में भी काम लाया जाता है। पानी और चूने में मिलाकर इसे कीड़े मारने के लिए पौधों पर छिड़का जाता है।

5.10 जिप्सम कैल्सियम सल्फेट



$CaSO_4$ $2H_2O$

जिप्सम प्रकृति में भारी परिमाण में मिलता है। ऐलाबास्टर और सेलेनाइट इसकी रवेदार किस्में हैं। चूने के पत्थर और तनु सल्फ्यूरिक एसिड (गंधक का तेजाब) की अभिक्रिया से भी कैल्सियम सल्फेट तैयार किया जा सकता है।

कैल्सियम कार्बोनेट + सल्फ्यूरिक एसिड →
कैल्सियम सल्फेट + जल + कार्बन डाइआक्साइड

5.11 जिप्सम के गुण और उपयोग

जिप्सम एक सफेद रवेदार ठोस पदार्थ है जो थोड़ा-थोड़ा पानी में घुल जाता है।

प्रयोग 16.

परखनली में जिप्सम के कुछ टुकड़े लेकर 120 डिग्री से० पर गर्म कीजिए। आप देखेंगे कि इसमें से थोड़ा-सा पानी निकलेगा और सफेद चूर्ण शेष रह जायगा। इस चूर्ण में थोड़ा पानी मिलाइए। आप देखेंगे कि यह जम जाता है। इस चूर्ण को *प्लास्टर ऑफ पैरिस* कहते हैं।

इस प्रयोग को दोहराइए। जिप्सम को 200 डिग्री सें० से ऊपर गर्म कीजिए। अब आप देखेंगे कि पानी की उपस्थिति में यह अब नहीं जमता। इस प्रकार आपने यह देखा कि बहुत गर्म करने से प्लास्टर ऑफ पैरिस की जमने की शक्ति समाप्त हो जाती है। इस अवस्था में जिप्सम को *मृत दग्ध* (dead burnt) कहते हैं।

कार्बन के साथ गर्म करने पर जिप्सम को अपचयित करके कैल्सियम सल्फाइड बनाया जा सकता है। जब कैल्सियम सल्फाइड को किसी अम्ल के साथ अभिक्रिया की जाती है, तो उसमें हाइड्रोजन सल्फाइड निकलती है।

प्रयोग 17.

कठोर काँच की परखनली में जिप्सम का चूर्ण और कोयले का चूर्ण मिलाकर लीजिए और गर्म कीजिए। गर्म मिश्रण की हाइड्रोक्लोरिक एसिड से अभिक्रिया कीजिए। आप देखेंगे कि ऐसा करने पर एक बदबूदार गैस निकलेगी। इस गैस को *हाइड्रोजन सल्फाइड* भी कहते हैं।

अमोनियम सल्फेट बनाने में जिप्सम का प्रयोग किया जाता है। अमोनियम सल्फेट एक उपयोगी उर्वरक है। सीमेंट और दीवारों पर किए जाने वाले प्लास्टरों के बनाने में जिप्सम बहुत काम आता है। कागज पर चमक लाने या भरत के काम में और रंगीन चाक या पेस्टल के रंग तैयार करने में भी जिप्सम इस्तेमाल होता है। प्लास्टर ऑफ पैरिस इसी से बनता है जो कि मूर्तियाँ खिलौने, गहने, अस्पतालों में पट्टियाँ आदि बाँधने के काम आता है। ऐलाबास्टर जिप्सम की ही एक किस्म है जो प्याले, प्लेटें और बर्तन आदि बनाने में प्रयुक्त होता है।

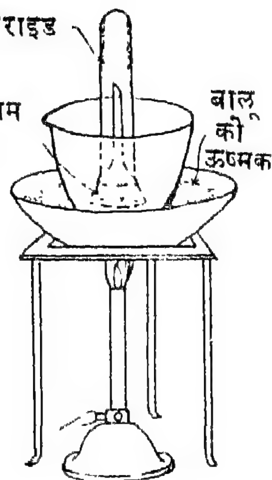
5.12 अमोनियम क्लोराइड (NH_4Cl)

अमोनियम क्लोराइड भी एक और सामान्य लवण है, जिसका बहुत इस्तेमाल होता है और जिसे बहुत लोग जानते हैं। इसे ऊर्ध्वपातन द्वारा शुद्ध किया जाता है। प्रयोगशाला में यह हाइड्रो-क्लोरिक एसिड में से अमोनिया को गुजार कर तैयार किया जाता है।

अमोनिया + हाइड्रोजन क्लोराइड →
अमोनियम क्लोराइड

5.13 अमोनियम क्लोराइड के गुण और उपयोग

शुद्ध अमोनियम क्लोराइड सफेद क्रिस्टलीय (रवेदार) ठोस पदार्थ है जो बहुत जल्द पानी में घुल जाता है। जब यह पानी में घुलता है तो इससे ठंडक निकलती है। जब यह गर्म किया जाता है तो इसका ऊर्ध्वपातन हो जाता है।



चित्र-49. उर्ध्वपातन (नमक और अमोनियम क्लोराइड को अलग करना)

प्रयोग 18.

चित्र 49 की तरह थोड़ा-सा नमक और अमोनियम क्लोराइड एक चीनी की परत में लेकर और उस पर एक कीप उल्टी रख कर गर्म कीजिए। आप देखेंगे कि अमोनियम क्लोराइड वाष्पित होकर कीप की दीवारों पर जमा हो जाएगा। इस घटना को *ऊर्ध्वपातन* कहते हैं और अमोनियम क्लोराइड तथा नमक के मिश्रण में से दोनों को अलग-अलग करने के लिए इसका उपयोग किया जाता है। लवण अवाष्पशील है और इस कारण इसका वाष्पन नहीं होता जब कि अमोनियम क्लोराइड का वाष्पन हो जाता है। बहुत गर्म करने पर अमोनियम क्लोराइड अपघटित होकर अमोनिया और हाइड्रोजन क्लोराइड में बदल जाता है।

प्रयोग 19.

एक परखनली में अमोनियम क्लोराइड को कास्टिक सोडा घोल या बुझे हुए चूने के साथ गर्म कीजिए। ऐसा करने पर एक तीखी गैस निकलेगी। अब काँच की एक छड़ को हाइड्रोक्लोरिक एसिड में भिगोकर परखनली में डालिए। आप देखेंगे कि सफेद धूम निकलने लगेगा। इस गैस से लाल लिटमस नीला हो जाएगा। इस गैस को *अमोनिया गैस* कहते हैं। यह वायु से हल्की होती है और इसे वायु के नीचे की ओर विस्थापन द्वारा एकत्रित किया जा सकता है।

टाँका लगाने और खाने-पीने के बर्तनों पर राँगा चढ़ाने में अमोनियम क्लोराइड का काफी इस्तेमाल होता है। लैक्लानचे और बैटरियों के सूखे सेलों में बिजली बनाने के लिए अमोनियम क्लोराइड काम मे लाया जाता है। कुछ औषधियाँ बनाने, कपड़ा रंगने और छींट की छपाई में इस्तेमाल किया जाता है। प्रयोगशाला के लिए यह एक महत्वपूर्ण अभिकर्मक है।

संक्षेप

अम्ल, *क्षारक* और *लवण* यौगिकों के तीन भिन्न प्रकार हैं।

जब कोई अम्ल किसी क्षारक से अभिक्रिया करता है तो लवण बनता है।

इस अभिक्रिया को *उदासीनीकरण* कहते हैं।

लवण प्रायः रंगहीन होते हैं किन्तु बहुत-से रंगीन भी होते हैं।

लवण विद्युत अपघट्य होते हैं और अम्ल तथा *क्षारक* भी ऐसे ही होते हैं।

विद्युत अपघट्य वह पदार्थ है जो घोल रूप में विद्युत आवेशित कण उत्पन्न करते है जिन्हें आयन कहते हैं, और साथ ही जो विद्युत धारा के चालक होते हैं। नकारात्मक आयनों को *ऋणायन* कहते हैं और सकारात्मक आयनों को *धनायन* कहते हैं।

लवणों से अदीप्त बुन्सन ज्वाला में रंग आ जाता है। यह रंग उनके धनायनों के कारण आता है।

जब किसी लवण के क्रिस्टल (रवे) के गर्म होने पर कड़कड़ाहट के साथ टूटते हैं तो यह एक विशेष घटना मानी जाती है।

क्रिस्टलीकरण जल उस पानी को कहते हैं जो किसी पदार्थ की संयुक्तावस्था में उसके क्रिस्टलों में मौजूद रहता है। वे लवण जिनमे क्रिस्टलीकरण जल रहता है *जलयोजित लवण* कहलाते हैं।

वही लवण गर्म होने पर बिना पिघले जब वाष्पित होते और फिर से ठंडा होने पर ठोस रूप में जम जाते हैं तो इस घटना को *ऊर्ध्वपातन* कहा जाता है।

जब कोई जलयोजित लवण वायु के लिए प्रभाव्य हो तो उसके क्रिस्टलीकरण जल का कुछ भाग निकल जाता है और यह चूर्ण का रूप ले लेता है। ऐसे लवण को *उत्फुल्ल लवण* कहते है और इस घटना को *उत्फुल्लन* कहा जाता है।

दोहराने के लिए प्रश्न

1 क्षारक, अम्ल और लवण क्या होते हैं? प्रत्येक के तीन-तीन उदाहरण दीजिए।

2 लवण एक विद्युत अपघट्य है, यह कहने का क्या अर्थ होता है?

3 ऋणायन और धनायन क्या होते हैं? उदाहरण देकर समझाइए।

4 नमक के मुख्य स्रोत क्या हैं? नमक के उपयोग बताइए।

5 नमक के तीन गुण बताइए।

6 संक्षेप में बताइए कि नाइटर कैसे प्राप्त किया जाता है ? इसके उपयोगों का उल्लेख कीजिए और इसके तीन गुण बताइए ।

7 संगमरमर क्या होता है ? चूने के पत्थर या चाक से यह कैसे भिन्न है ?

8 ऐसा करने पर क्या होता है :

(i) संगमरमर को गर्म करने पर ।

(ii) संगमरमर के चूर्ण और हाइड्रोक्लोरिक एसिड की अभिक्रिया होने पर ।

9 संगमरमर, चूने के पत्थर और चाक के महत्वपूर्ण उपयोग बताइए । उस गैस का नाम बताइए जो इनमें से किसी को भी हाइड्रोक्लोरिक एसिड के साथ मिलाकर गर्म करने पर निकलती है ।

10 कॉपर सल्फेट कैसे बनता है ? इसके महत्वपूर्ण उपयोग बताइए । यह समझाइए कि कॉपर सल्फेट तूतिया के नीले रवे गर्म करने पर सफेद क्यों हो जाते हैं ।

11 ऐसा होने पर क्या होता है :

(i) परखनली में कॉपर सल्फेट के रवे गर्म करने पर।

(ii) दो बीकरों में कॉपर सल्फेट का घोल लेकर उनमें से एक में लोहे की कील और दूसरे में जस्त की छड़ डालने पर ।

12 जिप्सम क्या है ? इसके अन्य प्रकार बताइए । जिप्सम के भिन्न प्रकारों के महत्वपूर्ण उपयोगों का वर्णन कीजिए ।

13 जब जिप्सम को 120 डिग्री से० पर गर्म किया जाता है तो कौन-सी वस्तु बनती है ? उस वस्तु के विभिन्न उपयोग बताइए ।

14 ऐसा करने पर क्या होता है :

(i) जिप्सम को पत्थर या लकड़ी के कोयले के चूर्ण के साथ गर्म करने पर ।

(ii) जिप्सम को 120 डि० सें० पर गर्म करने पर ।

(iii) गर्म जिप्सम पर पानी की अभिक्रिया करने पर ।

15 अमोनियम क्लोराइड क्या होता है ? यह कैसे प्राप्त होता है ? इसके महत्वपूर्ण प्रयोग बताइए ।

16 अमोनियम क्लोराइड को आप लवण क्यो मानते हैं ? अमोनियम क्लोराइड और नमक के मिश्रण को आप अलग कैसे करेंगे ।

17 ऐसा करने पर क्या होता है :

(क) अमोनियम क्लोराइड को गर्म करने पर,

(ख) अमोनियम क्लोराइड को कास्टिक सोडा के साथ गर्म करने पर,

(ग) अमोनियम क्लोराइड के घोल को सिल्वर नाइट्रेट से मिलाने पर,

(घ) अमोनियम क्लोराइड और कास्टिक सोडा को मिलाने से जो गैस निकलती है उसे हाइड्रोक्लोरिक एसिड में से गुजारने पर।

18 आप यह कैसे दिखाएँगे कि जब क्षारक और अम्ल अभिक्रिया करते हैं तो लवण बनता है।

अध्याय 6

कार्बनिक पदार्थ

6.1 कार्बनिक यौगिक

अभी तक हमने उस पदार्थ के बारे में पढ़ा है जो प्रकृति से अकार्बनिक होता है और जिसका संबंध खनिजों से है। किन्तु कार्बनिक पदार्थ भी हम नित्य देखते हैं। कार्बनिक पदार्थ भी उतने ही नहीं बल्कि अधिक महत्वपूर्ण हैं और ये पौधों और प्राणी जगत से संबंध रखते है। सभी कार्बनिक यौगिकों में कार्बन एक अनिवार्य तत्व रहता है। इनमें से अधिकांश में हाइड्रोजन रहती है और बहुतों में नाइट्रोजन और ऑक्सीजन होती है। इनकी संख्या बहुत अधिक है। दस लाख से भी अधिक यौगिक अभी तक मौजूद हैं और यह संख्या प्रति वर्ष 5 प्रतिशत की दर से बढ़ती जा रही है।

कार्बनिक यौगिक प्रकृति में विभिन्न जीवित कोषाओं में उपस्थित रहते हैं। ये पौधों, प्राणियों और मनुष्यों की जीवित कोषाओं में मौजूद रहते हैं। इसलिए ऐसे यौगिकों का रसायन बहुत-सी बातों में जीवन से संबंध रखता है। प्रयोगशाला में भी बहुत-से प्राकृतिक कार्बनिक यौगिक तैयार किए गए है किन्तु फिर भी बहुत-से ऐसे कार्बनिक यौगिक हैं जो प्रकृति में नहीं मिलते किन्तु सामान्य उपलब्ध कच्चे माल से शुद्ध रूप में प्रयोगशाला में ही बनाए गए है। इस प्रकार के दो पदार्थ हैं, कोयला और पैट्रोलियम जिन पर कार्बनिक रासायनिक उपयोग बहुत कुछ आधारित है।

6.2 कार्बनिक यौगिक का महत्व

कार्बनिक यौगिक हमारे लिए अत्यधिक महत्व के है। ऐसा कहा जाता है मनुष्य की मूल आवश्यकताएँ भोजन, कपड़ा और मकान हैं और ये सभी आवश्यकताएँ कार्बनिक यौगिकों द्वारा ही पूरी होती हैं। इस प्रकार हमारा लगभग सौ प्रतिशत भोजन कार्बनिक होता है। ऊनी, सूती, रेशमी या आधुनिक ढंग के *नायलॉन*, *टैरेलीन* और रेयन के सभी वस्त्र कार्बनिक होते है। इमारतें बनाने की सबसे महत्वपूर्ण वस्तु लकड़ी है जो कि कार्बनिक होती है। फिर मनुष्य को अपना स्वास्थ्य ठीक रखने के लिए बिटामिनों की और रोगों के उपचार के लिए औषधियों की आवश्यकता होती है। तो बिटामिन और औषधियाँ भी कार्बनिक हैं।

6.3 यौगिकों के अभिलक्षण

गुणों की दृष्टि से कार्बनिक यौगिक अकार्बनिक यौगिकों से बहुत भिन्न होते हैं। कुछ महत्वपूर्ण भिन्नताएँ ये हैं:

क) कार्बनिक यौगिक या तो कम ताप पर पिघलने वाले ठोस पदार्थ या द्रव गैसें होते हैं। इसके विपरीत अकार्बनिक यौगिक सामान्यत: ऊँचे तापमान पर पिघलते हैं।

ख) सभी कार्बनिक यौगिकों के जलने पर कार्बन डाइ-आक्साइड, जल और सभी गैसें निकलती हैं और कोई अवशिष्ट नहीं बचता। किन्तु अकार्बनिक यौगिक प्रायः नहीं जलते।

ग) कार्बनिक यौगिक प्रायः पानी में नहीं घुलते किन्तु कार्बनिक द्रवों जैसे अल्कोहल, बैन्जीन, ईथर और पैट्रोल भी घुल जाते हैं। अकार्बनिक यौगिक सामान्यतः इससे विपरीत होते हैं।

एक खुले जार में थोड़ा-सा तारपीन का तेल (टरपेन्टाइन आयल) लेकर उसमें आग लगाइए। आप देखेंगे कि बिना अवशिष्ट छोड़े ही तेल जल जाएगा। जार के गैस को ताजे चूने के पानी से परीक्षा कीजिए। आप देखेंगे कि चूने का पानी दूधिया हो जाएगा जिससे यह पता चलता है कि यह गैसें कार्बन डाइआक्साइड हैं।

प्रयोग 2.

एक परखनली में कुछ तेल और पानी लेकर अच्छी तरह मिलाइए। दूसरी परखनली में तेल और बैन्जीन लेकर इसी तरह हिलाइए। आप देखेंगे कि तेल बैन्जीन में घुल जाएगा पर पानी में नहीं घुलेगा।

अब हम कुछ सामान्य कार्बनिक पदार्थों के बारे में चर्चा करेंगे जो हम अपने नित्य के जीवन में इस्तेमाल करते हैं जो काफी महत्वपूर्ण है।

6.4 पैट्रोल या गैसोलीन

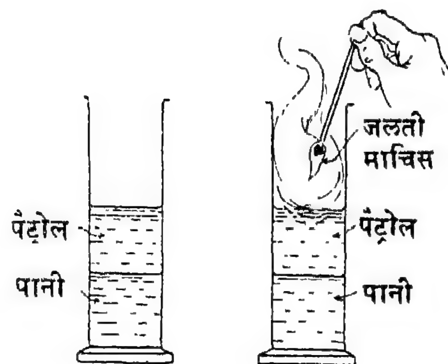
पैट्रोल या गैसोलीन प्राकृतिक पैट्रोलियम से बनाया जाता है और पैट्रोलियम कुछ क्षेत्रों में पृथ्वी में से निकाला जाता है। पैट्रोलियम बहुत-से पदार्थों का मिश्रण होता है। यह पदार्थ आसवन द्वारा अलग-अलग किए जा सकते हैं। इस प्रकार बहुत-से कार्बनिक पदार्थ प्राप्त किए जाते हैं। पैट्रोल या गैसोलीन हल्के और अधिक वाष्पशील पदार्थों में से हैं।

6.5 पैट्रोल या गैसोलीन

पैट्रोल एक गंधहीन द्रव है जिसका कोई निश्चित क्वथनांक (खौलने का बिन्दु) नही है। यह तापमान के एक परिसर पर आसवित होता है, जिससे यह प्रकट होता है कि यह एक मिश्रण है। यह पानी से हल्का होता है और पानी में मिलता भी नहीं। यह बहुत शीघ्र ज्वलनशील है।

प्रयोग 3.

एक गैस जार में थोड़े-से पैट्रोल और पानी को मिलाइए। आप देखेंगे कि पैट्रोल पानी के ऊपर तैर रहा है। लकड़ी की जलती हुई चिपटी लेकर इस मिश्रण में लगाइए। आप देखेंगे कि पैट्रोल पानी के ऊपर जलने लगेगा और जैसा कि चित्र-50 में दिखाया गया है इससे धुएँ वाली ज्वाला निकलेगी। यह इस बात का प्रमाण है कि इसमें कार्बन है।



चित्र-50. *पैट्रोल पानी में नहीं मिलता और ज्वलनशील होता है।*

पैट्रोल कार्बन और हाइड्रोजन के यौगिकों का मिश्रण होता है। यह यौगिक *हाइड्रोकार्बन* कहलाते हैं। इनका एक अलग वर्ग है, जिनके अभिलक्षण

गुण होते हैं। पैट्रोल मोटरों के काम आने वाला बहुत महत्वपूर्ण ईंधन है। यह ग्रीजी पदार्थों को घुला देता है और इसलिए कपड़ों के ड्राइक्लीनिंग में काम आता है।

6.6 बैन्जीन

बैन्जीन कोलतार से निकाला जाता है। कोलतार कोयले के आसवन से तैयार होता है। बैन्जीन केवल कार्बन और हाइड्रोजन का यौगिक है और कोलतार के हाइड्रोकार्बनों में यह सबसे प्रचुर है। यह हाइड्रोकार्बन *एरोमैटिक हाइड्रोकार्बन* कहलाते हैं और यह *ऐलिफैटिक हाइड्रोकार्बन* से भिन्न होते हैं जो पैट्रोलियम से तैयार किए जाते हैं।

6.7 बैन्जीन के गुण और उपयोग

शुद्ध बैन्जीन रंगहीन द्रव्य होता है और यह 80 डिग्री सें० पर खौलता है। यह पानी में नहीं घुलता। यह ज्वलनशील होता है और धुएँदार ज्वाला के साथ जलता है, जिससे यह पता चलता है कि इसमें कार्बन का काफी अंश है।

प्रयोग 4.

काँच की एक छड़ को बैन्जीन में डुबा कर बुन्सन ज्वाला के ऊपर ले जाइए। आप देखेंगे कि यह काले धुएँदार ज्वाला के साथ जलेगा।

बैन्जीन ग्रीज़युक्त पदार्थों, रबड़ और राल को विलय कर देता है और इस कारण इसे इन पदार्थों के विलायक की भाँति इस्तेमाल किया जाता है। कपड़ों की ड्राईक्लीनिंग के लिए बैन्जीन काम आता है। दूसरे मूल्यवान कार्बनिक रसायन बनाने के लिए भी इसका प्रयोग किया जाता है।

6.8 नैफ्थलीन

नैफ्थलीन केवल कार्बन और हाइड्रोजन का एक और यौगिक है। अतः यह एक *हाइड्रोकार्बन* है।

6.9 नैफ्थलीन के गुण और उपयोग

नैफ्थलीन एक रवेदार ठोस होता है। इसकी बड़ी-बड़ी सफेद और चमकदार प्लेटें होती हैं जो 80 डिग्री सें० पर पिघल जाती हैं। यह पानी में नहीं घुलता किन्तु बैन्जीन जैसे कार्बनिक द्रव्यों में घुल जाता है।

नैफ्थलीन बहुत प्रदीप्त ज्वाला के साथ जलता है और इसके जलने से बहुत-सा काजल जमा हो जाता है। इसी कारण इसे कोयले की गैस की प्रदीपन क्षमता को बढ़ाने के लिए उसके साथ मिला लिया जाता है। यह शलभों को प्रतिकर्षित करता है और इसलिए गोलियों के रूप में कपड़ो आदि को कीड़ों से बचाने के लिए इस्तेमाल किया जाता है। रंजक द्रव्यों के संश्लेषण में नैफ्थलीन का उपयोग किया जाता है।

6.10 रबड़

रबड़ प्राकृतिक स्रोतों से भी प्राप्त होती है और कृत्रिम विधियों से भी तैयार की जाती है। प्राकृतिक रबड़, रबड़ के पेड़ से निकाले जाने वाली दूधिया रंग के तरल (जिसे लेटक्स कहते हैं) के स्कंदन द्वारा प्राप्त किया जाता है। यह एक बहुलक है और *आइसोप्रीन* की यूनिटों का बना होता है, जो कि एक हाइड्रोकार्बन है। कृत्रिम या संश्लिष्ट रबड़ छोटे हाइड्रोकार्बनों के मेल से बनती है। इस प्रक्रिया को *बहुलकीकरण* (पालीमेराइजेशन) कहते हैं।

संश्लिष्ट रबड़ को विभिन्न नामों से बेचा जाता है, जैसा बूना एन०, बूना एस० और नियोप्रीन। इन रबड़ों के प्रत्यास्थता की भिन्न-भिन्न श्रेणियाँ होती हैं और उनके विशेष गुण होते है।

6.10 रबड़

प्राकृतिक रबड़ की प्रत्यास्थता और नम्यता या लचीलापन को एक प्रक्रिया द्वारा परिवर्तित किया जाता है जिसे *वल्कनीकरण* कहते है। इस प्रक्रिया का विकास चार्ल्स गुडईयर ने किया था। इस प्रक्रिया में कच्चे रबड़ को गंधक के साथ गरम किया जाता है। इससे रबड़ इतना कठोर हो जाता है कि वह घिसने और फटने को सहन करने की क्षमता रखता है।

6.11 रबड़ के गुण और उपयोग

प्राकृतिक रबड़ पीलापन लिए सफेद ठोस होता है। कच्चा रबड़ बैन्जीन में घुल जाता है और अन्य कार्बनिक द्रवों में भी। संश्लिष्ट रबड़ पैट्रोल में अविलयशील है और जब इसे सुलगाया जाता है तो यह धुएँदार ज्वाला के साथ जलता है।

वल्कनीकृत रबड़ भिन्न-भिन्न प्रकार की वस्तुएँ विशेष रूप से मोटरों के टायर वनाने के काम आती है।

6.12 अल्कोहल

रसायन-विज्ञान में अल्कोहल को इथायल अल्कोहल या *इथानोल* कहते हैं। यह ईथेन का एक हाइड्राक्सी व्युत्पन्न होता है। यह केवल कार्बन हाइड्रोजन और ऑक्सीजन का यौगिक है। यह सामान्यतः माड़ी या शर्करा के किण्वन द्वारा तैयार किया जाता है।

6.13 अल्कोहल के गुण और उपयोग

शुद्ध रूप में अल्कोहल एक रंगहीन द्रव्य है जो एक निश्चित तापमान (78·5 डिग्री सें०) पर खौलता है। यही इसका क्वथनांक है। यह ज्वलनशील होता है और बिना धुएँ की ज्वाला के साथ जलता है। यह पानी में मिल सकता है। यह भाँति-भाँति की मद्य और शराबों के रूप में इस्तेमाल किया जाता है। यह शराबें भिन्न-भिन्न तनुता की अल्कोहल मात्रा होती हैं, जिनमें कुछ स्वाद और मिठास देने वाले पदार्थ मिला दिए जाते हैं। प्रयोगशाला और औषधशाला में घोलक के रूप में अल्कोहल का बहुत प्रयोग किया जाता है। यह स्प्रिट लैंपों में जलती है किन्तु इस काम के लिए अल्कोहल की एक घटिया और अशुद्ध किस्म इस्तेमाल की जाती हैं, जिसे *मैथिलेटिड स्प्रिट* कहते हैं। अल्कोहल बहुत-से उपयोगी कार्बनिक पदार्थ बनाने के लिए भी आवश्यक होती है। अल्कोहल का एक और उपयोग खाने की वस्तुओं में स्वादकारक अर्थात् एसेन्स तैयार करना भी है।

प्रयोग 5.

लगभग 5 घन सें० अल्कोहल एक परखनली में लीजिए। इसमें सान्द्रित सल्फ्यूरिक एसिड की कुछ बूंदें डालिए। इसे खूब हिलाकर फिर इसमें 5 घन सें० ग्लेशियल एसिटिक एसिड डालिए फिर इसे हिलाकर गर्म कीजिए। परखनली की इन सब चीजो को एक बीकर से पानी पर छोड़ दीजिए। आप को सेबों की फलों की जैसी सुगंधी आएगी। यह वाष्पशील इथाइलेटिस एसिटेट बनने के कारण निकलती है, जिसे एस्टर कहते हैं।

6.14 ग्लिसरीन

रसायन में ग्लिसरीन को *ग्लिसरॉल* कहते हैं। यह अल्कोहल भी है और इसमें तीन हाइड्रोक्सील समूह

होते हैं। यह चर्बियों और तेलों में होता है और कुछ अम्लों के साथ मिला हुआ होता है। इन अम्लों को *फैटी अम्ल* या *फैटी एसिड* कहते हैं। यह चर्बियों और तेलों से तैयार किया जाता है और कुछ हाइड्रोकार्बोनों से भी इसका संश्लेषण होता है। यह केवल कार्बन, हाइड्रोजन और ऑक्सीजन का यौगिक है।

6.15 ग्लिसरीन के रंग और उपयोग

ग्लिसरीन रंगहीन चाशनी की तरह का द्रव्य है जो पानी से भारी होता है। यह पानी और अल्कोहल में मिल जाता है। यह स्वाद में मीठा होता है और इसलिए इसे मृदुकर्मक के रूप में काम में लाया जाता है। यह बहुत ही आर्द्रताग्राही होता है अर्थात् यह वायु के प्रभाव्य होने पर नमी को सोख लेता है।

यह बिना धुएँ की ज्वाला के साथ हल्के-हल्के जलता है। ग्लिसरीन का महत्वपूर्ण उपयोग नाइट्रोग्लिसरीन बनाने में होता है जो विस्फोट की प्रेरणा करने पर विस्फोट करता है। इसी कारण डाइनामाइट बनाने में इसका प्रयोग किया जाता है।

6.16 सिरका या चुक्र (विनेगर)

सिरका रासायनिक रूप से तनु एसिटिक एसिड (4–8 प्रतिशत) होता है। यह अल्कोहल युक्त लिकरों के किण्वन द्वारा बनाया जाता है। अल्कोहल का ऑक्सीकरण होकर यह एसिटिक एसिड बन जाती है जिससे सिरका बनता है। ठंडे देशों में खाद्य पदार्थों को खट्टा करने के लिए सिरके का इस्तेमाल किया जाता है।

6.17 नील (इन्डीगो)

नील एक नीले रंग का पदार्थ होता है जो एक भारतीय पौधे से निकाला जाता है जिसे *इन्डीगोफेरा टिंकटोरिया* कहते हैं। अब यह नैफ्थलीन से आरंभ करके संश्लेषण द्वारा भारी मात्रा में तैयार किया जाता है। यह कार्बन, हाइड्रोजन, ऑक्सीजन और नाइट्रोजन का यौगिक होता है।

नील बहुत ही गहरे नीले रंग का पानी में न घुलने वाला चूर्ण होता है और उसका रंग बहुत पक्का होता है। नील से रँगने के लिए एक विशेष विधि काम में लाई जाती है। यह विधि नीचे दिए गए प्रयोग मे प्रदर्शित की गई है।

प्रयोग 6.

लगभग 0·5 ग्राम नील लीजिए। इसको एक परात में सोडियम हाइड्रोसल्फाइट के क्षारीय घोल से अभिक्रिया कीजिए। आप देखेंगे कि नील के लियुको-इन्डीगो के रूप में अपचयित हो जाने के कारण इसका नीला रंग गायब हो जाएगा। इस घोल में सूती कपड़े के टुकड़े को डुबाकर उसे हवा में रखिए। आप देखेंगे कि नील का नीला रंग धीरे-धीरे वापस आने लगेगा और कपड़ा गहरे नीले रंग में रंग जाएगा।

6.18 शर्करा

शर्करा का रसायनिक नाम *सक्रोज* है। इसे चीनी या *केन शुगर* भी कहते हैं। *गन्ने के रस* को शुद्ध करके उसके क्रिस्टलीकरण द्वारा शर्करा बनाई जाती है। चाशनी में से शर्करा निकालने के बाद जो मातृ-द्रव्य बच रहता है उसे *सीरा* कहते हैं और यह अल्कोहल बनाने के काम आता है। चीनी कार्बन, हाइड्रोजन और ऑक्सीजन का यौगिक है। यह रंगहीन रवेदार ठोस होती है और व्यापा-

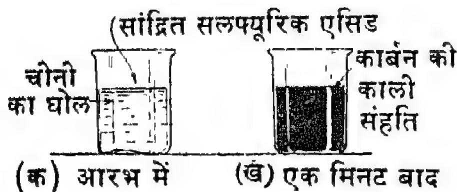
रिक मात्रा में मिलने वाला सबसे शुद्ध और सबसे सस्ता कार्बनिक पदार्थ है। यह पानी में विलयशील है किन्तु कार्बनिक घोलकों में नहीं घुलती। यह बहुत मीठी होती है और खाने-पीने की चीजों को मीठा करने में इसका इस्तेमाल किया जाता है। सांद्रित सल्फ्यूरिक एसिड के प्रयोग से यह निर्जलिक होती है और झुलस जाती है।

प्रयोग 7.

एक बीकर में चीनी के थोड़े से रवे लेकर उसमें सांद्रित सल्फ्यूरिक एसिड डालिए। आप देखेंगे कि रंगहीन रवे झुलस कर काले पदार्थ के रूप में बदल जाएँगे।

प्रयोग को निम्न प्रकार से दोहराइए

एक ऊँचे बीकर में चीनी का 10 घन सें० संतृप्त घोल लीजिए। इसमें धीरे-धीरे इतनी ही मात्रा में सांद्रित सल्फ्यूरिक एसिड छोड़िए। काँच की छड़ से मिश्रण को हिलाते जाइए। आप देखेंगे कि चीनी काले द्रव्यमान में अपघटित हो जाएगी। (चित्र-51)।



चित्र-51. *शर्करा पर सांद्रित सल्फ्यूरिक एसिड की क्रिया।*

जब सक्रोज को धीरे-धीरे लगभग 200 डिग्री सें० पर गर्म किया जाता है तो यह अपघटित हो जाती है और इससे कैरामेल नामक भूरे रंग की वस्तु बन जाती है। इसकी मिठाई बनाने और औषध पदार्थों को तथा शराब और बीयर में रंग देने में बहुत इस्तेमाल किया जाता है। जैम और चटनियाँ भी चीनी से बनती हैं।

6.19 ग्लूकोज

यह भी एक शर्करा है जो प्रकृति में व्यापक रूप में मिलती है। यह केवल कार्बन हाइड्रोजन और ऑक्सीजन का यौगिक है। ग्लूकोज पौधों के बीजों और पत्तियों, मीठे फलों और शहद में रहता है। व्यापारिक रूप में यह माड़ी से तैयार किया जाता है। ग्लूकोज एक रंगहीन रवेदार ठोस है जो पानी में घुल जाता है। इसका स्वाद मीठा होता है यद्यपि यह सक्रोज की अपेक्षा कम मीठा होता है। यह रोगियो और शिशुओं को भोजन के रूप में दिया जाता है। मिठाइयाँ बनाने और फलों के संरक्षण में इसका इस्तेमाल किया जाता है। महत्वपूर्ण विटामिन 'सी' ग्लूकोज से बनता है। ग्लूकोज का अभिलक्षणिक गुण यह है कि इससे नीचे लिखी विधि से रजत दर्पण बन जाता है।

प्रयोग 8.

एक परखनली में सिल्वर नाइट्रेट का घोल लीजिए। इसमें बस इतना-सा अमोनियम डालिए कि जो अवक्षेप बना है वह घुल जाए। अब थोड़ा-सा ग्लूकोज डालिए और इसे कुछ देर तक रख छोड़िए या हल्के-हल्के गरम कीजिए। आप देखेंगे कि परखनली की दीवारों पर चाँदी का दर्पण बन जाएगा। ग्लूकोज अमोनिया युक्त सिल्वर नाइट्रेट का चाँदी में अपचयन कर देता है।

6.20 माड़ी (स्टार्च)

माड़ी या मंड अनाजों की गरियों में प्रचुर

मात्रा में मिलता है। आलू और चावल में मंड बहुत होता है। आलुओं में लगभग 20 प्रतिशत और चावल में लगभग 75 प्रतिशत स्टार्च होता है। मंड पौधों के लिए भोजन का भंडार है किन्तु इसमें से अधिकतर मनुष्य अपने इस्तेमाल के लिए ले लेता है। मंड चीनी की तरह मीठा नहीं होता। व्यापारिक परिमाण में यह अनाज से तैयार किया जाता है। यह केवल कार्बन, हाइड्रोजन और ऑक्सीजन का यौगिक है और यह एक *कार्बोहाइड्रेट* है। यह सफेद रंग का एक ठोस होता है जो सामान्यतः पानी में नहीं घुलता। जब हाइड्रोक्लोरिक एसिड या सल्फ्यूरिक एसिड की उपस्थिति में उसे पानी के साथ गरम किया जाता है, तो स्टार्च से डैक्सट्रिन, माल्ट शर्करा और अंत में ग्लूकोज बनता है। इस प्रक्रिया को *हाइड्रोलिसिस या जल अपघटन* कहते हैं।

प्रयोग 9. *मंड का ग्लूकोज में जल अपघटन*

छोटे-से शंकुरूप फ्लास्क में लगभग 1 ग्राम माड़ी लीजिए। इसमें लगभग 10 घन सें० पानी और 2 घन सें० हाइड्रोक्लोरिक एसिड छोड़िए और इस मिश्रण को गरम कीजिए। इसमें थोड़ा फहर्टिंग (Fehting) साल्यूशन डालिए जिसमें कॉपर सल्फेट होता है और फिर गरम कीजिए। आप देखेंगे कि क्यूप्रस ऑक्साइड का लाल अवक्षेप बन जाएगा। इससे पता चलता है कि मंड ग्लूकोज में जल अपघटित (Hydrolysed) हो जाता है, जो क्षारीय कॉपर सल्फेट को अपचयित कर लाल क्यूप्रस ऑक्साइड बना देता है।

स्टार्च बहुत महत्वपूर्ण कार्बनिक पदार्थ है और भोजन तथा अन्य बहुत-से रूपों में इसका प्रयोग होता है।

आयोडीन के घोल के साथ मंड नीला रंग उत्पन्न करता है और यही आयोडीन की परीक्षा का तरीका है। गरम करने पर नीला रंग उड़ जाता है।

प्रयोग 10. *आयोडीन से माड़ी का नीला हो जाना*

एक बीकर में लगभग 10 घन सें० तनु पोटासियम आयोडाइड घोल लीजिए। इसमें लगभग 1 घन सें० क्लोरीन जल छोड़िए। आप देखेंगे कि घोल के रंग में परिवर्तन होगा और यह आयोडाइड में से आयोडीन के अलग हो जाने के कारण होता है। इसमें मंड के घोल की एक-दो बूंदें छोड़िए। तत्काल गहरा नीला रंग पैदा होगा। घोल को गरम कीजिए और नीला रंग गायब हो जाएगा। बीकर को ठंडा कीजिए और आप देखेंगे कि नीला रंग फिर से प्रकट हो जाएगा।

6.21 सैलूलोज

कपास और कागज दो बहुत सामान्य पदार्थ हैं और दोनों में ही मुख्यतः सैलूलोज होता है। सूती धागे में 90 से 97 प्रतिशत तक सैलूलोज होता है। पौधों की कोषाओं की दीवारें मुख्यतः सैलूलोज से ही बनती हैं। लकड़ी में 40 से 50 प्रतिशत तक सैलूलोज होता है। सैलूलोज लकड़ी, घास और सन के विघटन से बनाया जाता है।

सैलूलोज भी केवल कार्बन, हाइड्रोजन और ऑक्सीजन का यौगिक है और कार्बोहाइड्रेट होता है। यह मीठा नहीं होता। जब सैलूलोज पानी और किसी अम्ल (हाइड्रोक्लोरिक या सल्फ्यूरिक एसिड) के साथ दबाव के अधीन गरम किया जाता है तो इससे शर्कराएं निकलती हैं और अंत में ग्लूकोज बनता है। यह बहुत-सी वस्तुओं के तैयार करने का स्रोत है जैसे कि गन काटन (एक विस्फोटक पदार्थ), प्लास्टिक, मोटरों के काम आने वाली लैकर, फोटो की 'सुरक्षित' फिल्में, कृत्रिम रेशम (*एसिटेट रेयन और विसकोज़ रेयन*), रोधी पदार्थ, सैलूलायड, सैलोफेन और सैलूलोज स्पंज।

संक्षेप

कार्बनिक यौगिक वे यौगिक होते हैं जिनमें कार्बन अनिवार्य तत्व के रूप में रहती है। जलने पर इनसे कार्बन डाइऑक्साइड निकलती है।

हाइड्रोकार्बन केवल कार्बन और हाइड्रोजन का यौगिक होता है।

बैन्जीन और नैफ्थलीन हाइड्रोकार्बन हैं। पैट्रोल हाइड्रोकार्बनों का मिश्रण होता है।

एक *बहुलक हाइड्रोकार्बन* जटिल यौगिक होता है, जिसमें हाइड्रोकार्बनों की बहुत-सी यूनिटें होती हैं। रबड़ एक बहुलक हाइड्रोकार्बन है।

बहुलकीकरण वह प्रक्रिया है जिससे सरल इकाइयाँ विशाल अणु में बदल जाती हैं। ये इकाइयाँ एकलक कहलाती हैं और बड़े-बड़े अणु बहुलक कहलाते हैं।

पैट्रोल या गैसोलीन एक महत्वपूर्ण ईंधन है, जो प्राकृतिक पैट्रोलियम तेल से निकाला जाता है। यह संश्लिष्ट रूप मे भी बनाया जाता है।

अल्कोहल में ऑक्सीजन और साथ-ही-साथ कार्बन व हाइड्रोजन भी होती है। यह बहुत महत्वपूर्ण घोलक है। कार्बनिक अम्लो से मिलकर इससे सुवासित पदार्थ तैयार किए जाते हैं जो ऐस्टर कहलाते हैं। बहुत-से फलों और फूलों की सुगंधियों का कारण ऐस्टर ही होते हैं।

ग्लिसरीन भी एक अल्कोहल है। यह चर्बियों और तेलों का एक अवयव है और उन्हीं से जल अपघटन द्वारा ग्लिसरीन तैयार किया जाता है।

सिरके में लगभग 4 प्रतिशत एसिड होता है और यह खाद्य पदार्थ बनाने के काम आता है। यह तनु अल्कोहल से तैयार किया जाता है।

कार्बोहाइड्रेटों में शर्कराएँ, मंड और सैलूलोज होते हैं। ग्लूकोज और चीनी शर्कराएँ हैं। माड़ी और सैलूलोज बहुलक हैं जो ग्लूकोज की इकाइयों से बनते हैं। ये बेस्वाद होते हैं।

प्लास्टिक ऐसा पदार्थ है जिसे गर्म करके मुलायम किया जा सकता है, फिर साँचे में ढाला जा सकता है। साधारण कच्चे पदार्थों के बहुलकीकरण द्वारा प्लास्टिक बनता है।

कुछ संश्लिष्ट धागे सैलूलोज से बनते हैं। कपास प्राकृतिक पदार्थ है जिसमें मुख्यत: सैलूलोज होता है। कागज लगभग सारा-का-सारा सैलूलोज है।

नील पौधों से निकाला जाने वाला नीला रंग है। संश्लेषण द्वारा भी यह तैयार किया जाता है।

दोहराने के लिए प्रश्न

1. कार्बनिक यौगिक क्या होते हैं ? उदाहरण दीजिए ।
2. कार्बनिक पदार्थ अकार्बनिक पदार्थों से किस तरह भिन्न होते हैं ?
3. भिन्न-भिन्न प्रकार के कार्बनिक यौगिकों के नाम बताइए । अपने उत्तर में कुछ सामान्य कार्बनिक पदार्थों का उल्लेख कीजिए ।
4. हाइड्रोकार्बन क्या होता है ? उदाहरण दीजिए ।
5. बहुलक हाइड्रोकार्बन किसे कहते हैं ? उदाहरण दीजिए ।
6. अल्कोहल क्या है ? यह कैसे बनता है ? इसके दो महत्वपूर्ण उपयोग बताइए ।
7. ग्लिसरीन के कुछ महत्वपूर्ण गुण और उपयोग बताइए ।
8. (क) नैफ्थलीन, (ख) नील (ग) बैन्जीन के महत्वपूर्ण गुण और उपयोग बताइए ।
9. पैट्रोलियम क्या है ? इसमें से पैट्रोल कैसे निकलता है ? पैट्रोल और गैसोलीन के कुछ उपयोग बताइए ।
10. जब जली हुई माचिस गैस जार में पैट्रोल के पास लाई जाती है तो क्या होता है ?
11. कार्बोहाइड्रेड क्या होता है ? उदाहरण दीजिए ।
12. सक्रोज और ग्लूकोज के गुण और उपयोग बताइए ।
13. क्या रबड़ बहुलक यौगिक है ? इसके महत्वपूर्ण गुण क्या हैं ?
14. वल्कनीकृत रबड़ क्या होता है ? यह कैसे बनता है ?
15. कागज और कपास की रसायनिक प्रकृति क्या होती है ?
16. कुछ ऐसे सरल प्रयोग बताइए जिससे यह प्रकट हो कि दिया हुआ पदार्थ कार्बनिक है ?
17. हमारा भोजन अधिकांश कार्बनिक होता है । उदाहरण देकर इसे समझाइए ।
18. सैलूलोज क्या है ? कुछ ऐसे पदार्थों का नाम लीजिए, जिनमें अधिकांश सैलूलोज होता है।
19. उदाहरण देकर इस कथन को स्पष्ट कीजिए कि हमारे नित्य के जीवन में अकार्बनिक यौगिकों की अपेक्षा कार्बनिक यौगिकों का बहुतायत से उपयोग किया जाता है ।

20. ऐसा करने पर क्या होता है :

(क) शर्करा को हल्के-हल्के 200 डिग्री सें० पर गर्म करने पर।

(ख) शर्करा के चाशनी में सांद्रित सल्फ्यूरिक एसिड मिलाए जाने पर।

(ग) सिल्वर नाइट्रेट अमोनिया युक्त घोल में ग्लूकोज मिलाने पर।

21. उन स्त्रोतों का नाम बताइए जिनसे चीनी और ग्लूकोज प्राप्त होते हैं ?

22. सिरका (विनेगर) क्या होता है ? इसमें कौन-सा कार्बनिक यौगिक होता है ? इसके प्रयोग बताइए।

अध्याय 7

अणु और परमाणु : रसायनिक प्रतीक और सूत्र

7.1 अणु और परमाणु

प्राचीन काल में भी कुछ लोग सोचते थे कि द्रव्य *परमाणुओं* से मिल कर बना है। उन्होंने यह जान लिया था कि परमाणु सबसे छोटे ऐसे कण होते हैं जो और आगे विभक्त नहीं किए जा सकते। सन् 1808 में जान डाल्टन ने इस विचार को एक निश्चित रूप दिया और यह सिद्धांत प्रतिपादित किया, जिसे *डाल्टन का परमाणु सिद्धांत* कहा जाता है। अब हम परमाणुओं को द्रव्य का वह लघुतम कण मानते है जो रसायनिक अभिक्रिया में भाग ले सकता है किन्तु सभी परमाणु प्रकृति में स्वतंत्र रूप में विद्यमान नहीं रहते। यद्यपि वायु की अक्रिय गैसो के परमाणुओं की भाँति कुछ परमाणु स्वतंत्र रूप में रहते हैं किन्तु सामान्यतः ये दो या अधिक समूहो के रूप में ही रहते हैं। परमाणओं के इन समूहों या पुंजों को अणु (Molecules) कहते हैं। गैसीय मूलतत्वों जैसे हाइड्रोजन, ऑक्सीजन और नाइट्रोजन के एक-एक अणु दो-दो परमाणु होते है। यौगिकों के अणु में दो या अधिक भिन्न-भिन्न प्रकार के परमाणु होते हैं। उदाहरण के लिए, जल के एक अणु में हाइड्रोजन के दो और ऑक्सीजन का एक परमाणु होता है और कार्बन डाइआक्साइड के एक अणु में कार्बन का एक और ऑक्सीजन के दो परमाणु रहते हैं।

डाल्टन ने परमाणुओं के गुणों का निम्न प्रकार से वर्णन किया है :

(i) परमाणु पदार्थ के अंतिम कण होते हैं जिनसे मूलतत्व या यौगिक बनते हैं। यह न उत्पन्न किए जा सकते और न ही नष्ट किए जा सकते हैं।

(ii) एक ही मूलतत्व के परमाणु, गुणों की दृष्टि से एक-से होते हैं और उनका द्रव्यमान भी एक होता है।

(iii) एक मूलतत्व के परमाणुओं के गुण और द्रव्यमान दूसरे मूलतत्वों के परमाणुओं के गुणों और द्रव्यमान से भिन्न होते हैं।

(iv) भिन्न-भिन्न प्रकार के परमाणु सरल समाकल अनुपातों में संयुक्त होकर यौगिक बनाते हैं।

बाद की खोजों के आधार पर डाल्टन के उक्त कथनों मे से कुछ को परिवर्तित किया गया, किन्तु जिन नियमों का हम यहाँ विवेचन करेंगे उनकी दृष्टि से इनका महत्व नहीं है।

डाल्टन ने इन विचारों का रसायनिक संयोजन के निम्न नियमों को समझाने के लिए उपयोग किया था।

1. *द्रव्यमान संरक्षण या द्रव्य संरक्षण* का

1. *नियम*
2. *निश्चित समानुपात का नियम।*
3. *बहुसमानुपातों का नियम*

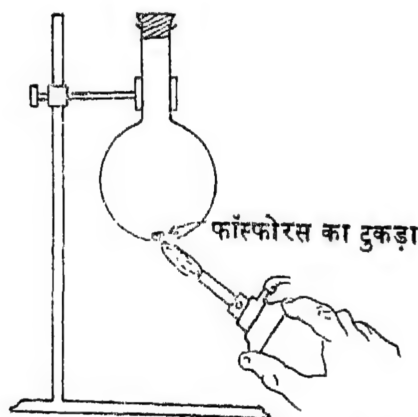
नोटः- एक और नियम जिसे पारस्परिक समानुपातों का नियम कहते हैं की चर्चा अध्याय 11 में की गई है।

7.2 द्रव्यमान संरक्षण या पदार्थ संरक्षण का नियम

इसे पहली बार सन् 1774 में लाभोजियर ने मालूम किया। उसने देखा कि एक ऐसे बंद पात्र में जब टीन अर्थात् राँगे को गरम किया गया जिसमें वायु मौजूद थी तो एक नया द्रव्य बन गया और कुल द्रव्यमान में कोई अंतर नहीं पड़ा। निम्नलिखित प्रयोगों द्वारा इस बात को और अच्छी तरह दिखलाया जा सकता है।

प्रयोग 1.

250 घन सें० क्षमता के एक गोल तली के मजबूत फ्लास्क को लेकर इसमें दो फिल्टर पेपर के बीच में रखकर सुखाई हुई सफेद फॉस्फोरस लीजिए। (चित्र-52 क)। फ्लास्क को इस तरह बंद कीजिए कि हवा न जा सके अर्थात् इसे वायुरोधी बना दीजिए : इसके लिए फ्लास्क में रबड़ की डाट लगानी होगी। अब एक ज्वाला से फ्लास्क की तली को गरम कीजिए जब तक कि फॉस्फोरस प्रज्वलित न हो जाए। आप देखेंगे कि एक नए पदार्थ (फॉस्फोरस ऑक्साइड) का सफेद धूम निकलने लगेगा। अब एक नल के नीचे पानी छोड़ कर फ्लास्क को ठंडा कीजिए। ऐसा करने से जलती हुई फॉस्फोरस से गर्मी और दबाव बहुत अधिक बढ़ने से रुक जाएँगे। जब फास्फोरस पूरी तरह जल जाए तो फ्लास्क को कमरे के तापमान तक ठंडा हो जाने दीजिए। फ्लास्क को सुखा कर फिर से तोलिए। आप देखेंगे कि भार में कोई अंतर नहीं पड़ा है।

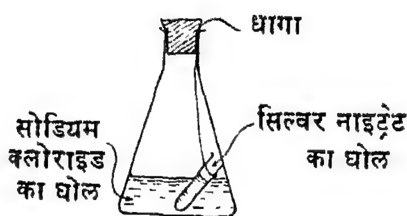


चित्र-52 (क) *द्रव्यमान संरक्षण का नियम*

प्रयोग 2.

एक शंकु आकार वाले फ्लास्क में लगभग 5 घन सें० तनु सोडियम क्लोराइड (नमक) का घोल लीजिए और रबड़ की डाट लगाकर इसे वायुरोधी बना दीजिए। फ्लास्क में चित्र-52 (ख) की तरह धागे से बाँध कर छोटी-सी परखनली फ्लास्क में डालिए, जिसमें लगभग 2 घन सें० सिल्वर नाइट्रेट घोल हो।

परखनली को इस ढग से रखिए कि इसके भीतर का घोल फ्लास्क के घोल से तभी मिले जब आप ऐसा करना चाहेंगे। फ्लास्क में डाट लगा दीजिए और सारे को बहुत सावधानी से तोल लीजिए। अब फ्लास्क को इस तरह झुकाइए कि दोनों घोल मिल जाएँ। आप देखेंगे कि फ्लास्क में एक नया पदार्थ (सिल्वर क्लोराइड) का सफेद रंग का अवक्षेप दिखाई देगा। फ्लास्क को फिर से तोलिए। आप देखेंगे कि भार में कोई अंतर नहीं पड़ा।



चित्र-52 (ख)

प्रयोग को (1) फैरस सल्फेट और अम्लीकृत पोटासियम परमैंगनेट और (2) पोटासियम आयोडाइड और मरक्यूरिक क्लोराइड के साथ फिर से दोहराइए। पहले में रंग अदृश्य हो जाएगा। फिर दूसरे में सिंदूरी अवक्षेप प्राप्त होगा।

परमाणु सिद्धांत के अनुसार परमाणु अविनाशी है अर्थात् रसायनिक परिवर्तन के प्रारंभ में जो परमाणु विद्यमान हैं वे इसके बाद भी विद्यमान रहने चाहिए। प्रत्येक परमाणु का एक निश्चित द्रव्यमान होता है, और रसायनिक परिवर्तन मे केवल परमाणुओं का पुनर्समायोजन और पुर्नसमूहन ही होता है। क्योंकि पदार्थ का कुल द्रव्यमान विभिन्न परमाणुओं के द्रव्यमानों का योग ही होता है इसलिए रसायनिक परिवर्तन के आरंभ में और अंत में कुल द्रव्यमान एक जैसा ही रहता है।

7.3 निश्चित द्रव्यमान समानुपातों का नियम

इस नियम की पहली बार परीक्षा सन् 1799 में जोसफ प्राउस्ट ने की थी। उन्होंने विभिन्न स्त्रोतों और विभिन्न तरीकों से प्राप्त यौगिकों का परीक्षण किया। उन्होंने यह पता लगाया कि शुद्ध रूप में एक विशेष यौगिक में वही मूलतत्व एक ही निश्चित समानुपातों में संयुक्त होकर रहते हैं। इस बात को प्रयोग 3 द्वारा और अच्छी तरह दिखाया जा सकता है।

प्रयोग 3.

एक तुली हुई चीनी (पोरसीलेन) की नाव में 0·4 ग्राम शुद्ध मैग्नीशियम लीजिए। चित्र 53 की तरह इस नाव को दाह नली में रखिए। इसे गर्म कीजिए और ऊपर से ऑक्सीजन की धारा निकालिए। मैग्नीशियम ऑक्सीजन में जलता है। जब मैग्नीशियम पूरी तरह जल जाय तो नाव में जो ऑक्साइड बना है उसके समेत नाव को तोल लीजिए। इस भार और नाव के पहले भार का जो अंतर होगा वही ऑक्साइड का भार होगा। ऑक्साइड के भार और जो मैग्नीशियम जला उसके भार का अंतर उस ऑक्सीजन के भार के बराबर होगा जो मैग्नीशियम से संयोजित हुई। आप देखेंगे कि मैग्नीशियम : ऑक्सीजन : 3 : 2 : (लगभग)।

उदाहरण 1

नाव का भार =5·00 ग्राम

नाव का भार+शुद्ध मैग्नीशियम =5·40 ग्राम

लिए गए मैग्नीशियम का भार=5·40 ग्राम—5·00 ग्राम
=0·40 ग्राम

नाव का भार+बना हुआ ऑक्साइड=5·66 ग्राम

संयुक्त ऑक्सीजम का भार=5·66 ग्राम—5·40 ग्राम
=0·26 ग्राम

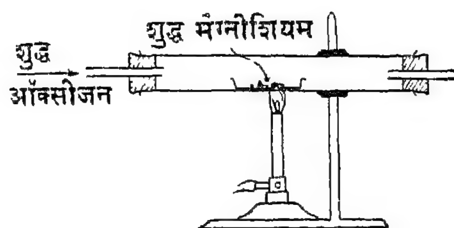
मैग्नीशियम और ऑक्सीजन का अनुपात होता है: 0·40 : 0·26 या 3 : 2 (लगभग)।

इस प्रयोग को करीब 0·40 ग्राम (सही भार) शुद्ध मैग्नीशियम को सूखे और तुले हुए क्रूसिबल में ले कर उसमें 5 घन सें० सांद्रित नाइट्रिक एसिड मिलाइए जिससे मैग्नीशियम नाइट्रेट बनेगा। सारे नाइट्रेट को ऑक्साइड में बदलने के लिए इसे वाष्पित कीजिए और खूब गरम कीजिए। अब क्रूसिबल के ऑक्साइड को तोलिए। जो ऑक्साइड बना और जो मैग्नीशियम काम आया उन दोनों के भार का अंतर उस ऑक्सीजन के भार के बराबर है जो मैग्नीशियम से संयुक्त हुई। आप फिर देखेंगे कि मैग्नीशियम : ऑक्सीजन : : 3 : 2 (लगभग)।

ाहरण 2.

खे क्रूसिबल का भार =20·00 ग्राम
सिबल का भार+शुद्ध मैग्नीशियम=20·40 ग्राम
म आए मैग्नीशियम का भार=20·40—20·00
=0·40 ग्राम
सिबल का भार+बना हुआ ऑक्साइड=20·66 ग्राम
युक्त ऑक्सीजन का भार=20·66—20·40 ग्राम
=0·26 ग्राम

मैग्नीशियम और ऑक्सीजन का अनुपात है: ·40 : 0·26 या 3 : 2 (लगभग)।



चित्र-53. *निश्चित समानुपातों का नियम*

इस प्रकार दो भिन्न तरीकों से जो मैग्नीशियम ऑक्साइड बना उसकी एक निश्चित रचना है और ो तैयार करने की विधि से बिल्कुल स्वतंत्र है।

डाल्टन के अनुसार एक यौगिक विभिन्न पर-ाणुओं के संयोजन से बनता है और इसके गुण स बात पर निर्भर करते हैं कि परमाणु किस प्रकार के हैं और उनके कितने परमाणु मौजूद हैं। इस कार विशेष गुणों वाला एक विशेष पदार्थ एक ी प्रकार के परमाणुओं के एक ही अनुपात में ापस में मिलने से बनता है। क्योंकि एक विशेष ूलतत्व के सभी परमाणुओं का एक ही द्रव्यमान ोता है इसलिए इस द्रव्य की भार के अनुसार ी एक ही रचना होती है।

7.4 बहुसमानुपातों का नियम

इस नियम का ज्ञान डाल्टन, जेकब बरजेलियस और अन्य वैज्ञानिकों ने प्रयोगों द्वारा पता लगाया। उन्होंने देखा जबकि दो मूलतत्वों के मिलने से दो या अधिक यौगिक बनते हैं तो दोनों में से एक मूलतत्व का भार दूसरे मूलतत्व के निश्चित भार के साथ मिलता है और यह एक सरल समाकल अनुपात में होते हैं। निम्नलिखित सरल उदाहरणों से इस बात को समझाया जा सकता है :

(i) ताँबे के दो ऑक्साइड बनते हैं। एक ऑक्साइड के एक अणु में ताँबे और ऑक्सीजन का एक-एक परमाणु होता है। दूसरे ऑक्साइड के एक अणु में ताँबे के दो परमाणु और ऑक्सीजन का एक परमाणु होता है। इस प्रकार ताँबे का क्रमशः एक और दो परमाणु ऑक्सीजन के परमाणु से मिलते हैं। अब आप जानते हैं कि एक ही मूलतत्व के पर-माणुओं का भार एक ही होता है। इस प्रकार दो यौगिकों में ऑक्सीजन के एक ही भार से मिलने वाले ताँबे का अनुपात 1 : 2 होता है जो सरल समा-कल अनुपात है।

(ii) कार्बन से दो ऑक्साइड बनते हैं। एक ऑक्साइड के एक अणु में कार्बन का एक परमाणु और ऑक्सीजन का एक परमाणु होता है। दूसरे ऑक्साइड के एक अणु में कार्बन का एक परमाणु और ऑक्सी-जन के दो परमाणु होते हैं। इस प्रकार दो ऑक्साइडों में कार्बन का एक पर-माणु ऑक्सीजन के क्रमशः एक और दो परमाणुओं से संयुक्त होता है। क्योंकि एक ही मूलतत्व के परमाणुओं

का भार भी एक ही होता है, इसलिए जो ऑक्सीजन कार्बन के एक परमाणु-भार से मिलती है तो उसका अनुपात 1 : 2 होता है, जो कि एक सरल समाकल अनुपात है ।

(iii) फॉस्फोरस से दो क्लोराइड बनते हैं । एक क्लोराइड में फॉस्फोरस का एक परमाणु क्लोरीन के तीन परमाणुओं से मिलता है । दूसरे क्लोराइड में फॉस्फोरस का एक परमाणु क्लोरीन के 5 परमाणुओं से मिलता है । इस प्रकार क्लोरीन के क्रमशः तीन परमाणु-भार और पाँच परमाणु-भार फॉस्फोरस के एक परमाणु भार से मिलते हैं और इनका अनुपात 3 : 5 होता है जो कि एक सरल समाकल अनुपात है ।

यह नियम परमाणु सिद्धांत से निकला है, जिसमें कहा गया है कि यदि दो मूलत्व एक से अधिक अनुपात में मिलकर भिन्न-भिन्न यौगिक बनाते हैं तो एक तत्व के उन परमाणुओं की संख्या में सरल संबंध रहता है जो दूसरे मूलतत्व के एक या अधिक परमाणुओं से मिलते हैं ।

7.5 रसायनिक प्रतीक और सूत्र

हर विज्ञान की अपनी अंकन पद्धति होती है । रसायन-शास्त्र में प्रतीकों और सूत्रों की आवश्यकता होती है और इसके लिए भी एक उपयुक्त अंकन पद्धति निकाली गई है । मूलतत्वों को सामान्यतः उनके नामों के पहले अक्षर से और कुछ तत्वों को अधिक स्पष्टता के लिए दो अक्षरों से प्रकट किया जाता है, जिनमें से एक नाम का पहला अक्षर होता है । नाम मुख्यतः लैटिन के रहते हैं । इनमें से कुछ अंग्रेजी में भी सामान्यतः प्रयुक्त होते हैं । इन अंकनों को प्रतीक (Symbol) कहते हैं । मूलतत्व के प्रतीक से उनके परमाणु और द्रव्यमान का बोध होता है । आगे कुछ सरल उदाहरण दिए जा रहे हैं :

मूलतत्व का नाम	*प्रतीक*
ऑक्सीजन	O
नाइट्रोजन	N
हाइड्रोजन	H
कार्बन	C
सल्फर	S
फॉस्फोरस	P
क्लोरीन	Cl
सोडियम (नेट्रियम)	Na
सोना (आरम)	Au
चाँदी (अर्जेन्टम)	Ag
ताँबा (क्यूपरम)	Cu
लोहा (फैरम)	Fe
पारा (हाइड्रैगिरम)	Hg
सीसा (प्लम्बम)	Pb
ऐल्युमिनियम	Al
जस्त (जिंक)	Zn
टिन या राँगा (स्टैनम)	Sn
कैल्सियम	Ca
मैग्नीशियम	Mg
पोटासियम (कैलियम)	K

मूलतत्व और यौगिक अणुओं के रूप में ही अपना स्वतंत्र अस्तित्व रख सकते हैं । अणु को सूत्र द्वारा प्रकट किया जाता है जिससे यह पता चलता है कि इनमें एक या अधिक मूलतत्वों के कितने परमाणु हैं ।

मूलतत्व के एक अणु में उसी तत्व के एक या अधिक परमाणु होते हैं और यौगिक के अणु में एक विशेष अनुपात में दो या अधिक मूलतत्वों के परमाणु होते हैं । यौगिकों के सूत्र लिखने में सभी मूलतत्वों के परमाणुओं की संख्या भी लिखी जाती है । इसके कुछ आम उदाहरण नीचे दिये जा रहे हैं ।

पदार्थ का नाम	*आणविक सूत्र*
हाइड्रोजन	H_2
नाइट्रोजन	N_2

ऑक्सीजन	O_2
जल	H_2O
कार्बन डाइआक्साइड	CO_2
सल्फर डाइआक्साइड	SO_2
फॉस्फोरस पैन्टाआक्साइड	P_2O_5
चूने का पत्थर	$CaCO_3$
अमोनियम क्लोराइड	NH_4Cl
सिल्वर ऑक्साइड	Ag_2O

रसायनिक सूत्र किस तरह बनाए जाते हैं, इस का विवरण ग्यारहवें अध्याय में दिया गया है।

संक्षेप

यदि किसी मूलतत्व को बराबर बाटते जाएँ तो इसका सबसे छोटा जो कण होगा वह *परमाणु* है। पदार्थ का वह कण *अणु* कहलाता है जो स्वतन्त्र अस्तित्व रख सकता है।

किसी मूलतत्व का अणु उसके परमाणुओं का वह समूह है जिसमें एक ही प्रकार के दो या अधिक परमाणु होते हैं।

यौगिक का अणु वह समूह है, जिसमें भिन्न-भिन्न प्रकार के दो या अधिक परमाणु होते हैं। डाल्टन का परमाणु सिद्धांत बताता है :

1. परमाणु पदार्थ के वे अंतिम कण होते हैं जिनसे मिलकर मूलतत्व या यौगिक बनते हैं। इन्हें न तो उत्पन्न किया जा सकता है और न नष्ट ही किया जा सकता है। साथ ही इन्हें और विभक्त भी नहीं किया जा सकता है।
2. एक ही मूलतत्व के सभी परमाणु गुणों में एक जैसे होते हैं और उनका द्रव्यमान या भार भी एक ही होता है।
3. भिन्न-भिन्न मूलतत्वों के परमाणु गुणों और भार से भिन्न होते हैं।
4. विभिन्न परमाणुओं के सरल समाकल अनुपात में संयुक्त होने से यौगिक बनते हैं।

परमाणुओं का रसायनिक संयोजन तीन महत्वपूर्ण नियमों के अनुसार होता है।

द्रव्यमान संरक्षण नियम है : किसी भी रसायनिक अभिक्रिया में भार में कोई परिवर्तन नहीं होता।

स्थिर समानुपात नियम है : किसी एक यौगिक में सदा वही मूलतत्व होते हैं और वे एक ही निश्चित समानुपात में (भार के अनुसार) संयुक्त रहते हैं।

बहु समानुपात नियम है : जब दो मूलतत्व मिलकर एक से अधिक यौगिक बनाते हैं, तो एक मूलतत्व के जो भिन्न-भिन्न भार दूसरे मूलतत्व के एक ही भार से संयुक्त होते हैं, उनमें एक सरल समाकल अनुपात रहता है।

किसी मूलतत्व के लैटिन नाम का पहला अक्षर या दो अक्षरों (एक पहला और एक अन्य) के समूह को *रसायनिक प्रतीक* कहते हैं। इससे मूलतत्व के एक परमाणु और साथ ही उसके

भार को अभिव्यक्त किया जाता है।

रसायनिक सूत्र एक अणु को बनाने वाले सभी मूलतत्वों के प्रतीकों का समूह होता है। यह किसी मूलतत्व या यौगिक के एक अणु में उपस्थित परमाणुओं की सख्या और प्रकार को प्रकट करना है। यह एक अणु और उसके भार को व्यक्त करता है।

दोहराने के लिए प्रश्न

1. परमाणु क्या होते हैं? उनके गुण बताइए।
2. अणु क्या होते हैं? यह परमाणु से किस प्रकार भिन्न होते हैं?
3. द्रव्यमान संरक्षण नियम को स्पष्ट कीजिए। इसको समझाने के लिए कोई प्रयोग बताइए।
4. 4·8 ग्राम मैग्नीशियम को 3·2 ग्राम ऑक्सीजन का प्रयोग करके पूरी तरह जला दिया जाता है। बताइए कि इससे बने हुए उत्पाद का भार कितना होगा?
5. निश्चित समानुपात नियम का वर्णन कीजिए और इसके दो उदाहरण दीजिए।
6. हाइड्रोजन और ऑक्सीजन के विस्फोट से जो जल उत्पन्न होता है उसमें दोनों तत्व भार के अनुसार 1:8 के अनुपात में होते हैं। यह बताइए कि शुद्ध जल के किसी भी नमूने की रचना क्या होगी?
7. बहु समानुपात नियम का वर्णन कीजिए और उसके दो उदाहरण दीजिए।
8. नाइट्रोजन के तीन ऑक्साइडों में नाइट्रोजन और ऑक्सीजन
   2 परमाणु : 1 परमाणु; 2 परमाणु : 3 परमाणु और 2 परमाणु : 5 परमाणु के क्रमिक अनुपात में होते हैं। इससे बहु समानुपात नियम का कैसे समर्थन होता है?
9. रसायनिक प्रतीक को स्पष्ट कीजिए और इसका अर्थ समझाइए। इसके पाँच उदाहरण दीजिए।
10. रसायनिक सूत्र को स्पष्ट कीजिए और इसका अर्थ समझाइए।
11. यह लिखिए :
    (क) (i) सोडियम, (ii) सिल्वर, (iii) ऑक्सीजन, (iv) क्लोरीन, और (v) फॉस्फोरस के रसायनिक प्रतीक।
    (ख) (i) सोडियम क्लोराइड, (ii) सोडियम सल्फेट, (iii) पोटासियमनाइट्रेट, (iv) कैल्सियम सल्फेट, (v) कैल्सियम कार्बोनेट के रसायनिक सूत्र।

अध्याय 8

द्रव्य की अवस्थाएँ और उनके अभिलक्षण

8.1 द्रव्य की अवस्थाएँ

हमने पहले अध्यायों में पढ़ा है कि सामान्य तापमान पर वायु ऑक्सीजन, नाइट्रोजन और हाइड्रोजन गैसें होती हैं। जल एक द्रव होता है, और कार्बन, सल्फर, फॉस्फोरस तथा बहुत-सी धातुएँ और उनके लवण ठोस होते हैं। इस प्रकार द्रव्य तीन अवस्थाओं में रहता है : (1) गैस, (2) द्रव और (3) ठोस।

उपयुक्त परिस्थितियों में ये तीनों अवस्थाएँ परस्पर परिवर्तनशील हैं। उदाहरण के लिए जल सामान्य तापमान पर द्रव रहता है किन्तु 100 डिग्री सें० या इससे ऊपर के तापमान पर गर्म करने से यह भाप (गैसीय अवस्था) में बदल जाता है और जब इसे 0 डिग्री सें० पर ठंडा किया जाता है तो यह ठोस बर्फ बन जाता है। इसके विपरीत जब बर्फ को गर्म किया जाता है तो यह पानी बन जाती है और जब पानी को खौलाया जाता है तो इसकी भाप बन जाती है और ठंडा होने पर फिर से यह द्रव जल के रूप में संघनित हो जाता है।

अब हम तीनों अवस्थाओं के अभिलक्षणों का अध्ययन करेंगे।

8.2 गैसों के अभिलक्षण

संपीड्यता गैसों का एक अभिलक्षणिक गुण है। गर्म होने पर ये फैलती हैं और दबाव पड़ने पर इनका आयतन घट जाता है।

गैसों को बड़ी आसानी से आयतनों में मापा जा सकता है। किसी भी पदार्थ का आयतन वह स्थान है जो पदार्थ ने घेर रखा होता है। गैस के किसी नमूने का आयतन वही होता है जो उस पात्र का आयतन होता है जिसमें गैस रखी हो।

आयतन सामान्यतः घन सें० मीटरों या लिटरों में लिखा जाता है।

1 लिटर=1000 मि० लिटर या लगभग 1000 घन सें० (CC)

1 घन सें० (CC)=4 डिग्री सें० पर एक ग्राम पानी का आयतन।

किसी भी गैस का आयतन तापमान पर निर्भर होता है और दबाव पर भी।

तापमान की परिभाषा इस प्रकार की गई है कि यह किसी पदार्थ की डिग्रियों में प्रकट की गई गर्मी का माप है। तापमान मापने के भिन्न-भिन्न पैमाने हैं। इनमें से ये पैमाने महत्वपूर्ण हैं : (i) सेंटिग्रेड पैमाना जो विज्ञान में सामान्यतः प्रयोग में लाया जाता है, (ii) फायरनहाइट पैमाना, (iii) स्थिर या कैलविन पैमाना। रसायन में आमतौर से सेंटिग्रेड और कैलविन पैमानों का प्रायः प्रयोग किया जाता है।

प्रयोगों द्वारा हमें गैसों के व्यवहार का जो ज्ञान मिलता है, उससे ऐसा लगता है कि –273 डिग्री सें० से और नीचे तापमान प्राप्त नहीं हो सकते। इससे हमें ताप का परम मापक्रम प्राप्त हो जाता है। पहली बार सन् 1848 में लार्ड कैलविन ने इस ताप मापक्रम का प्रस्ताव किया था। इस पैमाने में तापमान 'T' के प्रतीक से व्यक्त किया जा सकता है।

सेंटिग्रेड पैमाने के अनुसार 0 डिग्री सें० इसका शून्य होता है। जो पानी के जमने के बिन्दु के बराबर है। 100 डिग्री सें० पानी के खोलने के बिन्दु के तदनुरूप है। 0 डिग्री सें०जो 32 डिग्री फारेनहाइट (फारेनहाइट स्केल) के बराबर होता है और 100 डिग्री सें० जैसे कि चित्र-54 में दिखाया गया है 212 डिग्री फा० के तदनुरूप है।

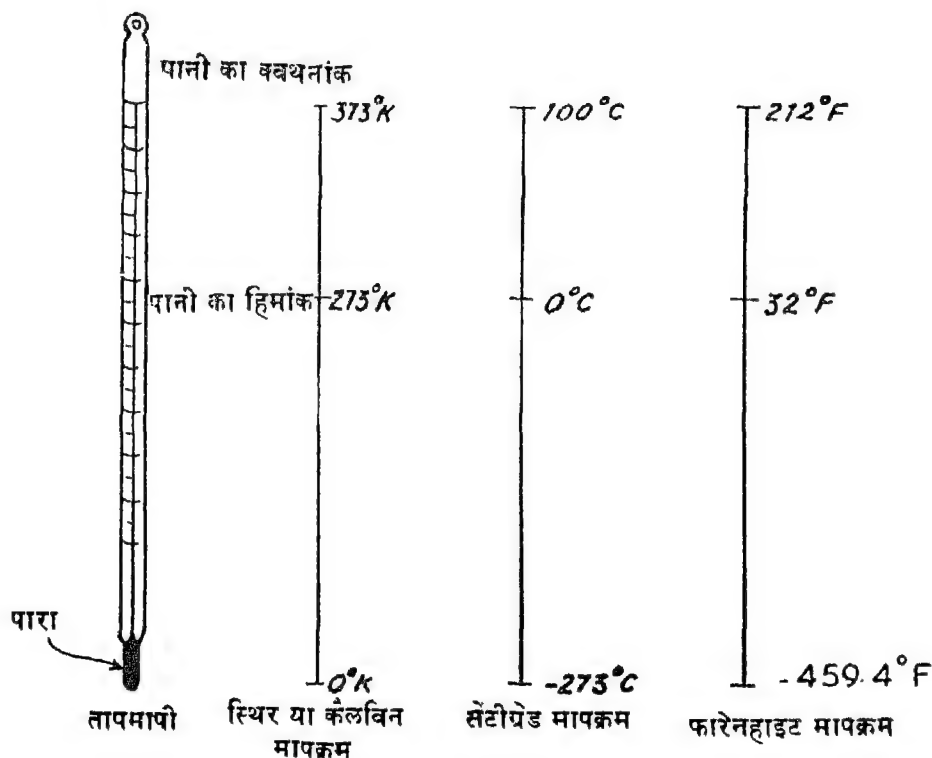
सें० तापमान ($t^{\circ}c$) अन्य पैमानों के तापमान में इस प्रकार बदला जा सकता है :

$$t^{\circ}C=(t+273)^{\circ}K=T^{\circ}$$

$$t^{\circ}C=(\frac{212-32}{100}\times)t+32=t_1{}^{\circ}F$$

$$t^{\circ}F=(t-32)\times\frac{100}{212-32}=t_2{}^{\circ}C$$

गैस के नमूने का आयतन दबाव पर भी निर्भर करता है। जिससे संघति प्रवाह की दिशा का पता



चित्र–54. तापमान के पैमाने

चलता है जिस प्रकार कि तापमान से ऊष्मा के प्रवाह की दिशा जानी जाती है। ऊष्मा गर्म वस्तु से ठंडी वस्तु की ओर प्रवाहित होती है और यदि रोका या बाँधा न जाए तो द्रव्य अधिक दबाव वाले स्थान से कम दबाव वाले स्थान की ओर हरकत करता है। उदाहरण के लिए मोटर टायर में दबा कर भरी हुई हवा अर्थात् ऊँचे दबाव वाली हवा बाहर से कम दबाव वाले क्षेत्र की ओर निकलती है। रबड़ के एक ब्लेडर में दबा कर भरी हुई हवा यदि ब्लेडर में छेद होता है तो इसके जरिए बाहर निकल जाती है।

हम पृथ्वी पर उस तरल की तली में रहते हैं जिसे वायुमंडल कहा जाता है और जो दबाव डालता है। निम्नलिखित प्रयोग द्वारा इस बात को प्रदर्शित किया जा सकता है।

प्रयोग 1.

एक ऐसी बोतल लीजिए जो डिब्बे की पतली टीन की बनी हो। एक चूषण पंप द्वारा इसकी हवा निकाल दीजिए। आप देखेंगे कि जैसे-जैसे वायु बाहर निकलती है वायुमंडल का दबाव बोतल को पिचकाता जाता है। यदि चूषण पंप न मिले तो इस प्रयोग को नीचे लिखे ढंग से बदला जा सकता है :

एक पतले से टीन के डिब्बे में थोड़ा-सा पानी लीजिए। पानी को गर्म कीजिए और कुछ देर तक इसे खौलाते रहिए ताकि सारी वायु का स्थान भाप ले ले। अब डिब्बे में कस कर डाट लगा दीजिए और इसे ठंडा होने दीजिए। इस पर ठंडा पानी छिड़किए। आप देखेंगे कि डिब्बा पिचक जाएगा। डिब्बे के भीतर की भाप के संघनित होने से भीतर का दबाव कम हो जाता है और बाहर से वायु-मंडल का ऊँचा दबाव या दाब इसे पिचका देती है।

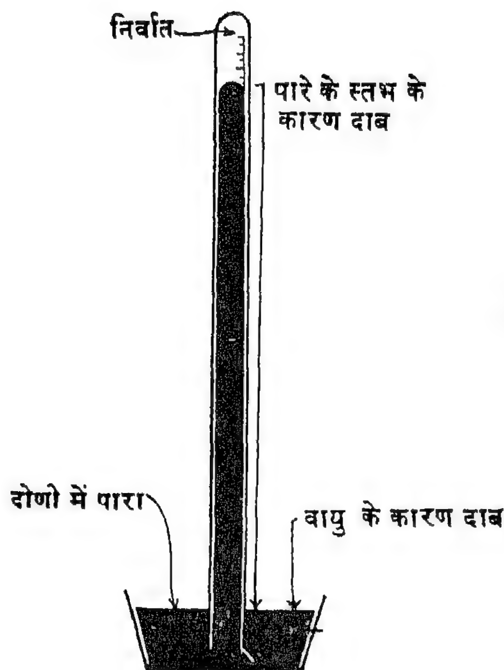
प्रयोग 2.

मजबूत काँच की एक ऐसी नलकी को लेकर पारे से भरिए जो लंबी या अंशांकित हो और एक ओर से बंद हो। चित्र-55 की तरह इसे एक ट्रफ में उलट दीजिए, जिसमें पारा भरा हो। आप देखेंगे कि नलकी में काफी ऊँचाई तक पारा भरा रहेगा और पारे के ऊपर नलकी में कुछ हिस्से में निर्वात बन जाएगा। क्योंकि कमरे के तापमान पर पारे का अधिक वाष्पन नहीं होता इस कारण रिक्त स्थान निर्वात ही होगा। इससे यह प्रगट होता है कि वायु पारे पर दबाव डालती है और यह दबाव पारे के कालम के भार के बराबर है। द्रवों का यह सामान्य गुण है कि द्रव के एक ही स्तर पर किसी भी बिन्दु पर दाब समान रहता है। इस प्रकार ट्रफ में पारे की सतह के स्तर पर

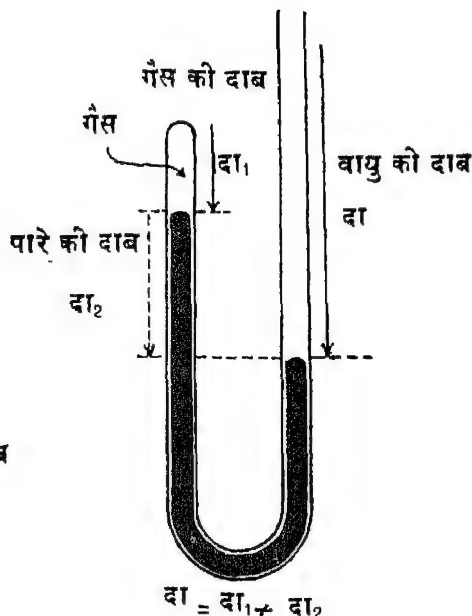
$$P_{atm} = P_{Hg}$$

इस प्रकार पारे के कालम द्वारा वायुमंडल के दबाव को मापना संभव है।

एक मानक वायुमंडलीय, 760 मिलिमीटर या 76 सेंटिमीटर लंबे पारे के कालम को, समुद्र तल पर 0 डिग्री सें० पर आधार देता है। इसे 1 वायुमंडलीय दबाव कहा जाता है। वायुमंडलीय दबाव 76 सेंटिमीटर ऊँचे और 1 वर्ग सेंटिमीटर के अनुप्रस्थ काटवाले पारे के कालम को अर्थात् 76 घन सेंटिमीटर पारे को संतुलित कर सकता है। इतने पारे का भार 76×13.6



चित्र–55. *बैरोमीटर नली*



चित्र–56. *मैनोमीटर*

ग्राम होगा क्योंकि 13·6 पारे का आपेक्षित घनत्व है।

जैसा कि चित्र-56 में दिखाया गया है गैस के एक नमूने के दबाव को दाबांतरमापी (मैनो-मीटर) में मापा जा सकता है।

$P = 1\,atm. P_2 = a\ mm\ of\ Hg$

$P = P_1 + P_2$

$P_1 = P - P_2 = 760 \div a\ mm\ of\ Hg$

(P बैरोमीटर से ज्ञात हो सकता है)

जब $P_2 = O$, $P_1 = P$.

8.3 द्रवों के अभिलक्षण

1. गैसों से भिन्न द्रव बहुत ही कम संपीड्य होते हैं। इनका आयतन दाब के साथ बदलता नहीं। हाँ, यह तापमान के साथ अवश्य बदलता है। दो या अधिक द्रवों को शुद्ध आयतन मोटे तोर पर मूल आयतनों के योग के बराबर होता है। सब गैसें किसी भी समानुपात में मिल सकती हैं और उन्हें *मिश्रणीय* कहा जाता है। किन्तु द्रव मिश्रणीय या आंशिक मिश्रणीय अथवा अमिश्रणीय हो सकते हैं, जिनकी अलग-अलग परतें बन जाती हैं। *द्रव अपने आयतन को बनाए रखते हैं, भले ही उनका पात्र चाहे जैसा हो।*

2. द्रवों की कोई *अभिलक्षणिक शक्ल नहीं होती।* जिस पात्र में द्रव भरे जाएं, वे उसी की शक्ल ले लेते हैं।

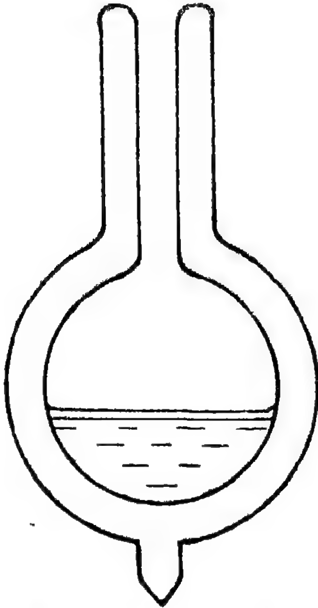
3. गैसें विसरित हो जाती हैं और द्रव भी। किन्तु द्रव *धीरे-धीरे विसरित* होते हैं और गैसें बहुत

तेजी से *विसरीत होती हैं।* जब पानी में स्याही की एक बूँद गिर जाती है तो यह सारे पानी में विसरित हो जाती है। द्रव का एक-एक अणु पात्र के एक कोने से दूसरे कोने तक जा पहुँचता है, किन्तु ऐसा करने में हर अणु को अरबों टकराव सहने पड़ते हैं। गैसों में अणुओं को इस तरह एक से दूसरी ओर जाने में इतनी अधिक टक्करें नहीं सहनी पड़ती। इस प्रकार गैस का अणु हरकत करने में और दूसरी गैसों से मिलने में अधिक स्वतंत्र होता है।

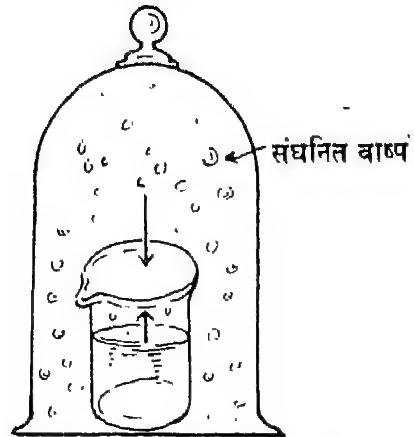
4. *प्रभाव्य होने पर द्रव वाष्पित होते हैं।* जब किसी द्रव को प्रभाव्य किया जाता है तो इसकी सतह पर से अणु उड़ जाते हैं।

जब कोई द्रव अरोधी पात्र से वाष्पित होता है तो इसका तापमान अधिक नहीं गिरता। किन्तु जब वाष्पन किसी *रोधी* पात्र (अर्थात् जिस पात्र पर रूई, ऊन या रबड़ जैसा अचालक पदार्थ लिपटा हो) से होता हो तो चारों ओर से ऊष्मा का प्रवाह मंद रहता है और द्रव का तापमान काफी गिर जाता है। इससे वाष्पित होने की गति घट जाती है। डेवर फ्लास्क या थर्मस फ्लास्क (देखिए चित्र-57) में ठीक ऐसा ही होता है। द्रव वायु (अत्यधिक वाष्पशील द्रव) इस प्रकार के पात्रों में घंटों तक सुरक्षित रखी जाती है।

5. *वाष्प दाब* : जब कोई द्रव बंद स्थान में वाष्पित होता है तो उसका स्तर थोड़ी देर के लिए गिरता है किन्तु कुछ देर बाद स्थिर हो जाता है। इसका मतलब यह हुआ कि द्रव के अणु तरल में से निकल कर बाहर के सीमित स्थान में चले जाते हैं और फिर लौट आते हैं। इससे पात्र में द्रव की मात्रा स्थिर रहती है और द्रव के ऊपर वाष्प में अणुओं का स्थानांतरण स्थिर हो जाता है। इसका कारण द्रव और ऊपर की वाष्प में गतिक साम्य का होना है। वाष्प में जो अणु होते हैं, वे दाब डालते हैं, जो द्रवों की विशेषता है। इसे द्रव का संतृप्त *वाष्पदाब* कहते हैं। वाष्पदाब इन बातों पर निर्भर करती है : (i) द्रव की प्रकृति, (*ii*) तापमान।



चित्र–57. डेवर का फ्लास्क



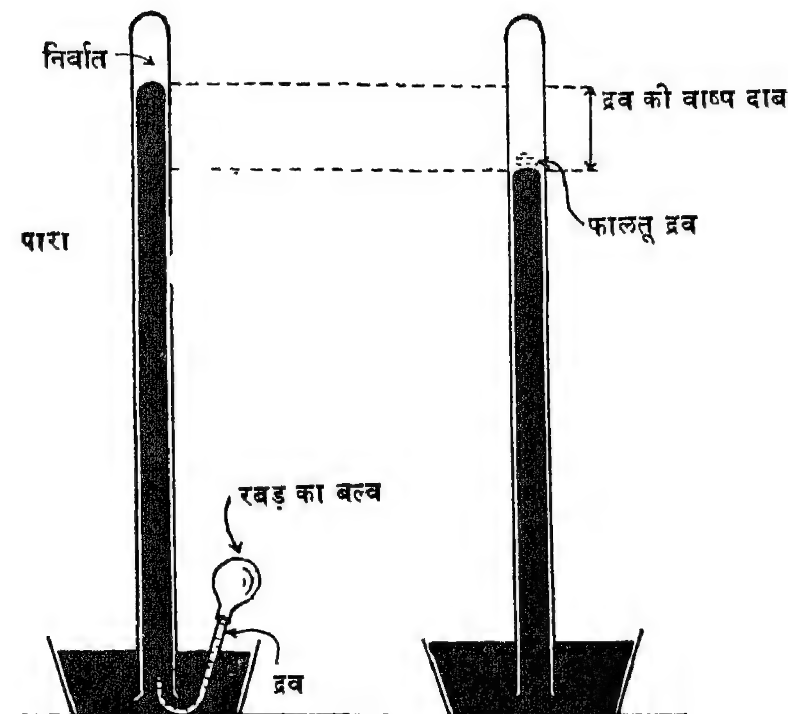
चित्र–58. *सीमित स्थान में वाष्पीकरण*

किसी निश्चित तापमान पर भिन्न-भिन्न द्रवों की भिन्न वाष्पदाब होती है। तापमान के बढ़ने से सभी द्रवों की वाष्पदाब भी बढ़ती जाती है। किसी निश्चित तापमान पर किसी द्रव की वाष्पदाब नीचे लिखे प्रयोग की भाँति मापी जा सकती है।

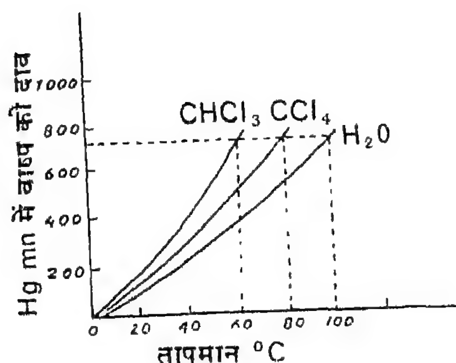
प्रयोग 3.

एक बैरोमीटर नली को पारा भर कर खड़ी कीजिए, जैसा कि चित्र 59 में दिखाया गया है। एक बिंदुपाती (ड्रापर) द्वारा बैरोमीटर नली में 2 घन सें० द्रव पहुँचा दीजिए। आप देखेंगे कि द्रव ऊपर चढ़ेगा और निर्वात में जाकर वाष्पित हो जाएगा। साथ ही पारे के स्तर में जो गिरावट आएगी उसकी ओर ध्यान दीजिए। इससे यह पता चलता है कि वाष्प दाब डालती है और वह दाब कमरे के नोट किए हुए तापमान पर पारे के पहले और बाद के स्तरों के अंतर के बराबर है।

विभिन्न तापमानों पर यही प्रयोग कीजिए। आप देखेंगे कि जैसा चित्र-60 में रेखाओं द्वारा दिखाया गया है, वायुदाब बढ़ती जाएगी। इस प्रकार *वायुदाब तापमान का कार्य है।*



चित्र–59. वायुदाब का मापन



चित्र-60. *तापमान बदलने के साथ वायुदाब का बदलना ।*

6. ***क्वथनांक या खौलने का बिंदु*** : जब किसी द्रव को खुले पात्र में गर्म किया जाता है तो यह बुल-बुले बन-बन-कर वाष्प की अवस्था में बदल जाता है। इस प्रक्रिया को द्रव का क्वथन या खौलना कहते हैं। एक निश्चित दाब पर प्रत्येक शुद्ध द्रव एक नियत तापमान पर खौलने लगता है (मान लीजिए 1 वायुमंडल)। इस तापमान को द्रव का ***क्वथनांक*** या ***खौलने*** का *बिंदु* (इस प्रकार $b._p = t°C$ लिखा जाता है) कहते हैं। *द्रव का क्वथनांक वह तापमान है, जिस पर द्रव की वाष्पदाब बाहर की वायुदाब के बराबर हो जाती है।*

द्रव का क्वथनांक दाब पर निर्भर करता है। यह दाब के साथ-साथ बदलता है अर्थात् जब दाब बढ़ती है तो क्वथनांक (b.p.) बढ़ जाता है। मानक या सामान्य क्वथनांक (b.p.) एक मानक वायुदाब अर्थात् 760 मिलिमीटर या हेक्टोमीटर के तदनुरूप होता है। प्रयोग द्वारा इसका मान निर्धारित किया जा सकता है।

7. ***द्रव का हिमांक*** : जब किसी द्रव को ठंडा किया जाता है तो यह जमकर ठोस हो जाती है। द्रव का जमना एक निश्चित दाब पर और एक निश्चित तापमान पर होता है। दाब के कम हो जाने से द्रव का हिमांक भी नीचा हो जाता है। किसी द्रव का मानक या सामान्य हिमांक (f. p.) मानक वायुदाब के तदनुरूप होता है। यह वह तापमान है जिस पर एक मानक वायुदाब पर या पारे के 760 मिलिमीटर पर द्रव जम जाता है।

8.4 ठोसों के अभिलक्षण

ठोसों के कुछ महत्वपूर्ण लक्षण इस प्रकार हैं :

i द्रवों की तरह ठोसों का *संपीडिन करना भी बहुत कठिन होता है* । वास्तव में वे प्रायः *असंपीड्य* ही होते हैं क्योंकि उनके अणु बहुत ही *निकट संपर्क* में होते हैं।

ii *ठोस अपना आयतन बनाए रखते हैं* जो कि पात्र के आकार या प्रकार से स्वतंत्र रहता है।

iii ठोस दृढ़ होते हैं और सामान्य परिस्थितियों में वे बहते नहीं। गैसों और द्रवों से भिन्न जो कि तरल होते हैं, *ठोसों का आकार निश्चित रहता है*। उनके अणुओं की अवस्थितियाँ स्थिर रहती है, जिससे उनकी निश्चित बनावट का पता चलता है।

iv *ठोस गैसों और द्रवों से इस बात मे भिन्न होते है कि वे विसरित नहीं होते।* यह इस बात से भी स्पष्ट होता है कि करोड़ों वर्ष तक शैलों की परतें अपने ही स्थान पर अविचल पड़ी रहती हैं और अपनी निश्चित परिसीमाओं को बनाए रखती हैं।

v *ठोस आमतौर से क्रिस्टल बनाते हैं* जो निश्चित ज्यामिती शक्ल के कण होते हैं। हर पदार्थ के क्रिस्टल या रवे अपनी-अपनी विशेषता रखते हैं। इनके चारों तरफ समतल पृष्ठ बने होते हैं, जिन्हें

फलक या फेस कहते हैं। ये फलक एक-दूसरे को किसी-न-किसी कोण पर प्रतिच्छेद करते हैं। हर पदार्थ का यह कोण उसका अभिलक्षण होता है। उदाहरण के लिए सोडियम क्लोराइड (नमक) घनीय क्रिस्टल बनाता है और गंधक (सल्फर) विषमलंबाक्ष या एकनताक्ष क्रिस्टल बनाता है। किन्तु यह भी देखा गया है कि एक रसायन पदार्थ भिन्न-भिन्न परिस्थितियों में भिन्न-भिन्न क्रिस्टल बना सकता है। इस गुण को *बहुरूपता* कहते हैं। इस प्रकार अणु अथवा परमाणु क्रमिक आकृतियों में रहते हैं जो किसी पदार्थ के अभिलक्षणिक होते हैं। अणुओं और परमाणुओं की यह व्यवस्था हर पदार्थ के लिए अलग-अलग होती है और इसे एक्स-रे-फोटोग्राफी या एक्स-रे विवर्तन द्वारा देखा *जा सकता है।*

संक्षेप

द्रव्य तीन भौतिक अवस्थाओं में रहता है : (1) *ठोस*, (2) द्रव, (3) *गैस*। उपयुक्त परिस्थितियो में ये अवस्थाएँ परस्पर परिवर्तनशील हैं। गैसें अत्यधिक संपीड्य होती हैं। द्रव और ठोस गैसें नहीं होते। गैस का आयतन तापमान और दाब पर भी निर्भर करता है। इसे सामान्यतः घन सें०, मिलिलिटरों या लिटरों में प्रकट किया जाता है।

गैस के किसी नमूने का आयतन वही ठोस होता है जो उसके पात्र का। द्रव किसी भी पात्र में अपने आयतन को बनाए रखते हैं।

तापमान किसी पदार्थ की *उष्मा की कोटि के माप* को कहते हैं। यह भिन्न-भिन्न पैमानों प्रायः सेंटिग्रेड और कैलविन की डिग्रियों में व्यक्त किया जाता है।

दाब या दबाव प्रति इकाई क्षेत्र पर पड़ने वाले बल को कहते हैं। यह प्रति वर्ग सेंटि-मीटर ग्रामों में प्रकट किया जाता है।

0 डिग्री सें० पर वायु की दाब का एक ऐटमास फियर होती है। यह 0 डिग्री सें० पर 760 मिलिमीटर पारे के दाब के बराबर होती है।

द्रवों का कोई विशेष आकार नहीं होता। ये जिस पात्र में रखे जाते हैं, उसीकी शक्ल ले लेते हैं।

गैसें विसरित होती हैं और द्रव भी। किन्तु द्रव धीरे-धीरे विसरित होते हैं और गैसें इससे अधिक तीव्रता से विसरित होती हैं।

प्रभाव्य होने पर द्रवों का वाष्पन होता है। अत्यधिक वाष्पशील द्रव बंद बोतलों में सुरक्षित रखे जाते हैं।

द्रव वाष्पदाब डालते हैं जो तापमान के साथ बढ़ती है । भिन्न-भिन्न द्रवों की एक ही तापमान पर भिन्न-भिन्न वाष्पदाब होती है ।

एक द्रव एक एटमासफियर दाब पर एक निश्चित तापमान पर खौलता है । यह तापमान उसका *क्वथनांक* कहलाता है ।

वायुदाब के अधीन एक द्रव एक निश्चित तापमान पर जमता है । यह तापमान उस द्रव का *हिमांक* कहलाता है ।

ठोसों का आयतन अपने पात्र के आकार या शक्ल से स्वतंत्र रहता है और वे उसे बनाए रखते हैं । इनका संपीडन काफी कठिन होता है । ये दृढ़ होते हैं और सामान्य अवस्थाओं में रहते हैं । ये विसरित भी नही होते । ये निश्चित ज्यामितीय आकृतियों के कण अर्थात् क्रिस्टिल बनाते है और ये आकृतियाँ हर पदार्थ की अपनी-अपनी होती हैं ।

हर ठोस वायुदाब के अधीन अपने-अपने निश्चित तापमान पर पिघलता है । यह तापमान उसका *गलनांक* कहलाता है ।

दोहराने के लिए प्रश्न

1. यह बताइए कि गुणों की दृष्टि से गैस, द्रव और ठोस किस प्रकार एक-दूसरे से भिन्न हैं ?
2. गैस के किसी द्रव्यमान का आयतन तापमान पर निर्भर करता है और दबाब पर भी । इस कथन को उदाहरण देकर स्पष्ट कीजिए ।
3. गैसों के आयतन और दाब में प्रयुक्त होने वाले यूनिटों के नाम बताइए । यह बताइए कि 5 लिटर की क्षमता वाले पात्र में सामान्य दाब के अधीन रखी गैस का आयतन घन सेंटि-मीटरों में कितना होगा ?
4. यह कहने का क्या अर्थ होता है कि गैस बहुत संपीड्य होती है । एक उदाहरण देकर इस कथन को स्पष्ट कीजिए ।
5. द्रव के वाष्पदाब का क्या अर्थ होता है ? आप किसी द्रव के वाष्पन को कैसे समझाएँगे ?
6. इनकी परिभाषा कीजिए :

    क) किसी द्रव का क्वथनांक

    ख) किसी द्रव का हिमांक

    ग) किसी द्रव्य का गलनांक

    घ) किसी पदार्थ का वाष्पदाब

7. किसी ऐसे प्रयोग का वर्णन कीजिए, जिससे यह प्रकट हो कि किसी द्रव का वाष्पदाब तापमान के साथ बदलती है।

8. चार ऐसे पदार्थों के नाम लीजिए जो गैस हों; चार जो द्रव हों; चार जो ठोस हों।

9. इस संबंध को पूरा कीजिए :

क) 27 डिग्री सें० = ······ °k

ख) 22.4 लिटर = ······

ग) 30,400 सी० सी० (घन सें०) = ······ लिटर

अध्याय 9

घोल

9.1 घोल

जब कोई ठोस द्रव अथवा गैस पानी में घुल जाती है तो उससे घोल बनता है। आइए, निम्नलिखित प्रयोगों द्वारा यह बताएँ कि घोल क्या होता है।

प्रयोग 1.

एक बीकर में थोड़ा-सा पानी लीजिए जिसमें थोड़ी-सी शर्करा (चीनी) डालिए और इसे काँच की छड़ से हिलाइए। आप देखेंगे कि चीनी पानी में घुल जाएगी। चीनी और पानी का एक समांगी द्रव्यमान बन जाएगा। इसे चखिए, यह मीठा होगा।

यही प्रयोग नमक और पानी के साथ कीजिए। आप देखेंगे कि नमक पानी में घुल जाएगा और यह घोल नमकीन होगा।

पानी में चीनी या नमक के समांगी मिश्रण को और इसी तरह दूसरे किसी मिश्रण को घोल कहते हैं।

इस प्रकार घोल कम-से-कम दो पदार्थों का समांगी मिश्रण होता है। जो पदार्थ घुलता है जैसे चीनी या नमक, उसे विलेय कहते हैं और जो अधिक मात्रा में होता है और जो दूसरे पदार्थ को अर्थात् विलेय को घोलता है, उसे विलायक कहते हैं। इस प्रकार चीनी या नमक और पानी का मिश्रण विलयन या घोल है और चीनी या नमक विलेय तथा पानी विलायक है। जब घोल का वाष्पन किया जाता है तो विलायक का वाष्पन हो जाता है और विलेय अवशिष्ट रह जाता है।

9.2 विलेयता और तापमान का प्रभाव

तीन बीकरों में अलग-अलग पानी लेकर उनमें बराबर-बराबर चीनी, नमक और रेत डालिए। सबको अच्छी तरह हिलाइए। आप देखेंगे कि नमक पानी में घुल जाएगा किन्तु चीनी और अधिक घुलेगी और रेत बिल्कुल नहीं घुलेगा। इससे हम यह निष्कर्ष निकालते हैं कि कुछ पदार्थ कम विलयशील होते हैं और कुछ अधिक विलयशील और कुछ पूर्णतः अविलयशील होते हैं। इस प्रकार विलयशीलता विलेय की प्रकृति पर निर्भर करती है।

प्रयोग 2.

एक बीकर में 100 सी० सी० (घन सेंटिमीटर) पानी लीजिए, इसमें थोड़ा-थोड़ा करके नमक डालिए और बराबर हिलाते जाइए। आप देखेंगे कि नमक

पानी में घुलता जाएगा किन्तु एक स्थिति ऐसी आ जाएगी जब नमक घुलना बंद हो जाएगा और जो नमक डाला जाएगा वह बीकर की तली में जमा होने लगेगा। अब बीकर को रेत के ऊष्मक पर गर्म कीजिए और नमक को हिलाते रहिए। आप देखेंगे कि नीचे बचा हुआ नमक भी पानी में घुल जाएगा। बीकर को ठंडा कीजिए। आप देखेंगे कि कुछ नमक घोल में से निकल कर फिर से बीकर की तली में इकट्ठा हो जाएगा। इस प्रकार जल की निश्चित मात्रा में ठोस की नियत मात्रा घुलती है और उसी तापमान पर उससे अधिक मात्रा नहीं घुलती।

एक निश्चित तापमान पर एक लिटर पानी में ठोस की जितनी मात्रा घुल जाती है, वह उस तापमान पर पानी में *ठोस की विलयशीलता* कही जाती है। तापमान के परिवर्तन का विलयशीलता पर काफी प्रभाव पड़ता है। ठोसों के साथ ऐसा होता है कि तापमान की वृद्धि के साथ उसकी विलयशीलता भी बढ़ जाती है।

प्रयोग 3.

एक बीकर में 19 ग्राम पोटासियम नाइट्रेट को काफी पानी में मिलाइए और उसे काँच की छड़ से हिलाइए। आप देखेंगे कि नाइट्रेट पानी में घुल जाएगा। थोड़ा-थोड़ा करके बीकर के घोल में और पोटासियम नाइट्रेट छोड़ते जाइए। हिलाने के बाद भी इसका कुछ भाग बिना घुला रह जाएगा। घोल को छान लीजिए। जो निर्मल निस्यंद निकलेगा वह कमरे के तापमान पर संतृप्त घोल होगा। इसमें कुछ और नाइट्रेट डालिए और इसे गर्म कीजिए। नाइट्रेट घुल जाएगा। अब घोल को ठंडा कीजिए। आप देखेंगे कि दूसरी बार में जो नाइट्रेट डाला गया था वह घोल से पृथक हो जाएगा। इससे हम यह निष्कर्ष निकाल सकते हैं :

(1) एक निश्चित तापमान पर संतृप्त घोल में उस तापमान पर विलेय की अधिकतम मात्रा रहती है।

(2) नीचे तापमान पर जो संतृप्त घोल बना है उसमें तापमान ऊँचा होने पर और अधिक विलेय समा सकता है।

(3) संतृप्त घोल तापमान नीचा होने पर कुछ विलेय को छोड़ देता हैं।

हमने प्रयोग-2 में देखा कि जब संतृप्त घोल को ठंडा किया जाता है तो कुछ विलेय बाहर आ जाता है। पर हमेशा ऐसा नहीं होता क्योंकि अति संतृप्त घोल भी बन सकता है। किसी घोल को उस समय अति संतृप्त कहा जाता है जब इसमें संतृप्त घोल से अधिक विलेय समाया रहता है। जब अति संतृप्त घोल में विलेय का एक रवा डाल दिया जाता है तो सारे अतिरिक्त विलेय का क्रिस्टिलीकरण हो जाता है। निम्नलिखित प्रयोग से इस बात को प्रदर्शित किया जा सकता है।

प्रयोग 4.

एक परखनली में 6 ग्राम सोडियम थायोसल्फेट चूर्ण लेकर 1 सी० सी० पानी डालिए। परखनली में ढीली डाट लगाइए और उसे पानी के ऊष्मक पर तब तक हल्के-हल्के गर्म कीजिए जब तक नमक घुल न जाए। अब इसे ठंडा कीजिए। आप देखेंगे कि नमक का क्रिस्टिलीकरण नहीं होता। इसमें विलेय का एक रवा डाल दीजिए। आप देखेंगे कि विलेय अलग होने लगेगा।

9.3 भिन्न ठोसों के लिए भिन्न विलायक

प्रयोग 5.

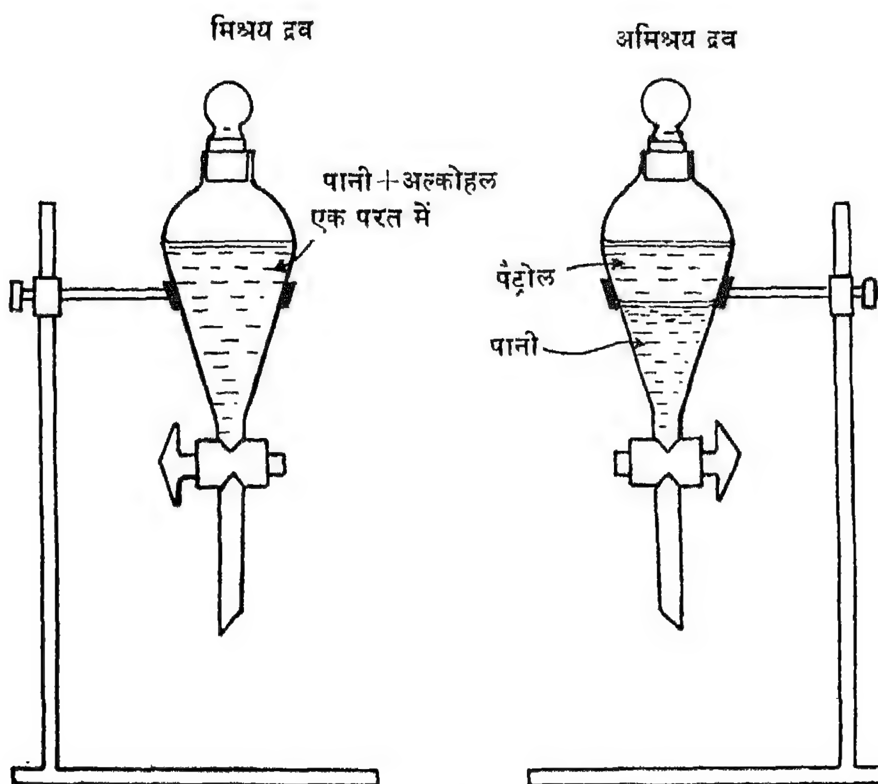
दो बीकर लेकर उसमें से एक में पानी और गंधक का चूरा मिलाइए और दूसरे में गंधक और कार्बन

डाइसल्फाइड मिलाइए। आप देखेंगे कि गंधक पानी में नहीं घुलती किन्तु कार्बन डाइआक्साइड में घुल जाती है। इसी प्रकार आप देखेंगे कि आयोडीन अल्कोहल में घुल जाता है और पानी में नहीं घुलता। इसका यह मतलब हुआ कि सब ठोस सब द्रवों में नहीं घुलते। चीनी, नमक और नाइटर जैसे कुछ ठोस पानी में घुल जाते हैं और मिट्टी के तेल में नहीं घुलते। जब कि गंधक या आयोडीन जैसे कुछ अन्य पदार्थ अन्य विलायकों में घुल जाते हैं।

9.4 द्रवों के द्रवों में घोल

प्रयोग 6.

एक पृथक्कारी कीप में कुछ अल्कोहल और पानी मिलाइए। दोनों को अच्छी तरह हिलाइए और आप देखेंगे कि दोनों द्रवों की एक ही परत बनती है। अब पानी और पैट्रोल ले कर ऐसा ही कीजिए। आप देखेंगे कि दोनों ही द्रव आपस मे मिलकर एक



चित्र–61. पृथक्कारी कीपों में द्रवों में द्रव

परत नहीं बनाते बल्कि दोनों की अलग-अलग दो परतें हैं।

इससे यह प्रकट होता है कि दो द्रव मिश्रणीय हो सकते हैं और उनकी एक परत बन सकती है या वे *अमिश्रणीय* हो सकते हैं और अपनी अलग-अलग परतें बना सकते हैं।

9.5 द्रवों में गैसों के घोल

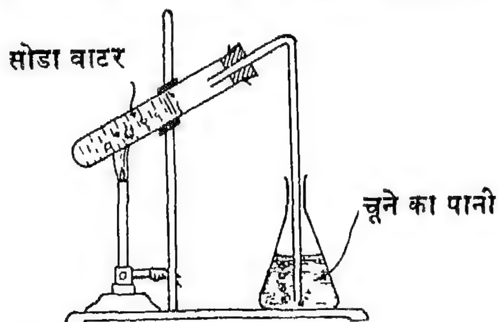
प्रयोग 7.

शंकु आकार के अलग-अलग फ्लास्कों में पानी लेकर उनमें से हाइड्रोजन क्लोराइड, अमोनिया और सल्फर डाइऑक्साइड गुजारिए। आप देखेंगे कि ये गैसें पानी में घुल जाएँगी और संतृप्ति की अवस्था से पहले इनके बुलबुले नहीं बनेंगे।

ऑक्सीजन और हाइड्रोजन गैसों से इसी प्रयोग को दोहराइए। आप देखेंगे कि इन गैसों के बुलबुले बन कर ये पानी से बाहर निकल जाएँगी, जिससे यह पता चलता है कि ये पानी में अधिक नहीं घुलती। इससे हम यह नतीजा निकालते हैं कि कुछ गैसें विलयशील होती हैं और कुछ अविलयशील। फिर भी कुछ हद तक सभी गैसें पानी में विलयशील होती हैं। कार्बन डाइआक्साइड ऐसी गैस है जो पानी में काफी घुलनशील है। दाब के अधीन यह जल्दी ही घुल जाती है और इसके घुलने से सोडावाटर बनता है। जब आप सोडावाटर की बोतल को खोलते हैं तो आप गैस की दाब को हटा देते हैं। कार्बन डाइआक्साइड बुलबुलों के साथ बाहर निकलती है और उफान के साथ सोडावाटर में से निकल जाती है। इससे यह पता चलता है कि दाब के घटने के साथ गैस की विलयशीलता घटती है और दाब के बढ़ने के साथ इसकी विलयशीलता बढ़ती है। *ठंडे पानी की अपेक्षा गर्म पानी में गैसें कम घुलनशील होती हैं।*

प्रयोग 8.

कार्बन डाइऑक्साइड से संतृप्त पानी (सोडा-वाटर) को एक परखनली में लौटिए। परखनली में एक ऐसी निकास नली फिट कीजिए जो शंकु आकार के फ्लास्क में रखे चूने के पानी में डूबी हो, जैसा कि चित्र-62 में दिखाया गया है। अब परखनली को गर्म कीजिए। परखनली में बुदबुदाहट या उफान-सा उठेगा और फ्लास्क में दूधियापन आएगा।



चित्र–62. *कार्बन डाइऑक्साइड गरम पानी में कम घुलनशील है।*

इससे यह प्रगट होता है कि गर्म करने पर घुली हुई गैस घोल से बाहर निकल जाती है। इस प्रकार गैस की विलयशीलता तापमान के बढ़ने से घट जाती है। हमने प्रयोग–2 और 3 में देखा कि ठोसों की घुलनशीलता तापमान के बढ़ने से प्रायः बढ़ जाती है।

9.6 किसी ठोस द्रव में विलयशीलता का निर्धारण कैसे करें।

प्रयोग 9.

अंशांकित जार की सहायता से नाप कर लग-

भग 100 सी० सी० शुद्ध पानी एक बीकर में लीजिए। इसमें पिसा हुआ नमक थोड़ा-थोड़ा करके छोड़ते जाइए और तब तक अच्छी तरह से हिलाते जाइए जब तक और नमक पानी में न घुले। यह कमरे के तापमान पर संतृप्त घोल बन गया। इसे छान लीजिए और निस्यंद को तुली हुई पोरसीलेन की वाष्पन परात में एकत्र कीजिए। परात और निस्यंद को तौल लीजिए और भार को नोट कर लीजिए। बालू के ऊष्मक पर परात को गर्म कीजिए ताकि घोल का पानी पूरी तरह वाष्पित हो जाए। जब पानी पूर्णत: वाष्पित हो जाए तो परात को जल-शोषित्र में ठंडा करके सूखे अवशिष्ट के साथ तौल लीजिए। भार को नोट करके इस प्रकार परिकलन कीजिए।

केवल परात का भार $= w_1 g$

परात का भार + निस्यंद $= w_2 g$

निस्यंद का भार $= w_2 - w_1 = a_1 g$

परात का भार + वाष्पन के बाद अवशिष्ट $= w_3 g$

अवशिष्ट का भार $= w_3 - w_1 = a_2 g$

प्रयुक्त निस्यंद में पानी का भार $= a_1 - a_2 = a_3 g$

कमरे के तापमान पर पानी में नमक की विलयशीलता $= \frac{a_2}{a_3} \times 100$

$= w$ g प्रति 100 ग्राम पानी

उदाहरण

जब 50 ग्राम नाइट्रेट कमरे के तापमान पर 200 सी० सी० पानी में पूरी तरह घुल गया तो पोटासियम नाइट्रेट का संतृप्त घोल तैयार हुआ। कमरे के तापमान पर पानी में नाइटर की विलयशीलता का परिकलन कीजिए।

संतृप्त घोल में नाइट्रेट का भार $= 50$ g

पानी का भार $= 200$ g

विलयशीलता $= \frac{50}{200} \times 100 = 25$ g प्रति 100 g जल

9.7 घोल का सांद्रण

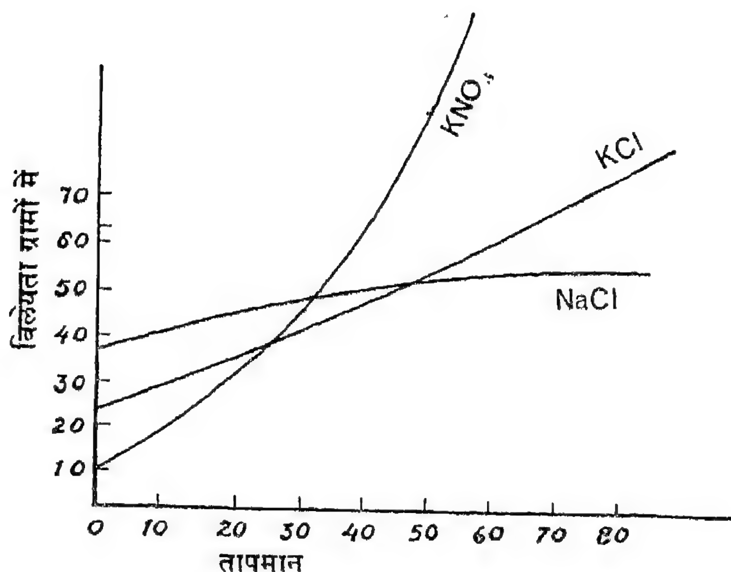
पानी में लवण की विलयशीलता यह बताती है कि निश्चित तापमान पर एक लिटर विलायक में लवण का सांद्रण कितना होगा।

$$\text{प्रति लिटर सांद्रण} = \frac{\text{विलय का द्रव्यमान}}{\text{लिटरों में विलायक का आयतन}} = \frac{M}{V}$$

यदि सांद्रण ऊँचा होता है तो घोल भी सांद्र होता है और जब यह कम होता है तो घोल तनु कहलाता है।

9.8 विलयशीलता वक्र रेखा क्या होती है ?

हमने यह देखा कि किसी पदार्थ की विलयशीलता एक ही द्रव में तापमान के साथ घटती-बढ़ती है। ठोसों के लिए यह प्राय: तापमान बढ़ने के साथ बढ़ती है। किन्तु गैसों के साथ तापमान के बढ़ने से यह घटती है। विभिन्न तापमानों पर किसी पदार्थ की विलयशीलता को ऐसी रेखाओं द्वारा, जिन्हें *विलयशीलता वक्र रेखा* कहा जाता है, सरलता से ग्राफ पर निरूपित किया जा सकता है। कुछ लवणों की विलयशीलता (पानी में) वक्र रेखाएँ



चित्र 63. *विलयशीलता वक्र रेखाएँ*

चित्र-63 में दिखाई गई है।

वक्र रेखाओं पर नजर डालते ही यह पता चल जाता है कि तापमान के साथ विलयशीलता कैसे बदलती है। समुद्र के जल में जो लवण मिले रहते हैं उनकी विलयशीलता वक्र रेखाओं से हमें उन स्थितियों का पता चल जाता है, जिनके द्वारा नमक और अन्य लवण समुद्र जल से निकाले जाते हैं।

9.9 घोलों का महत्व

हमारे लिए घोलों की प्रक्रिया (ठोसों और गैसों का द्रवों में घुलना या द्रवों का मिश्रण) बहुत अधिक महत्व रखती है। हमारे जीवन की प्रक्रियाएँ भी इसी पर निर्भर करती हैं। हम जो भोजन खाते हैं वह पाचन में सरल पदार्थों में बदल जाता है। ये सरल पदार्थ या तो रक्त में घुल जाते हैं या उसमें मिल जाते हैं। रक्त इन पदार्थों को भिन्न-भिन्न अंगों में पहुँचा देता है, जहाँ उन्हें अपने काम के लिए इन पदार्थों की आवश्यकता पड़ती है। हम साँस के साथ जो ऑक्सीजन भीतर खींचते हैं वह रक्त में घुल जाती है जो उसे कोषाओं में पहुँचा देता है, जहाँ भोज्य पदार्थों का कार्बन डाइऑक्साइड और पानी में ऑक्सीकरण हो जाता है। इस प्रकार घोल की यह प्रक्रिया मनुष्य जीवन के लिए अनिवार्य है।

रसायन उद्योग में भी यह प्रक्रिया अत्यंत महत्वशाली है क्योंकि अधिकांश रसायन अभिक्रियाएँ घोल में ही होती हैं।

विलयशील और अविलयशील पदार्थों को अलग करने के लिए भी घोलों की आवश्यकता पड़ती है। उदाहरण के लिए कैफ़ीन एक महत्वपूर्ण औषधि है और यह क्लोरोफार्म के जरिए चाय की पत्तियों

से निकाली जाती है। जो घुलनशील पदार्थ होते हैं, उन्हें उनके उपयुक्त विलायकों के साथ बने घोल में से क्रिस्टलीकरण द्वारा पृथक और शुद्ध किया जाता है।

मापी हुई मात्रा में दवाएँ देने में घोलों से बड़ी सहायता मिलती है। इसका कारण यह है कि बहुत छोटी मात्रा को आसानी से तोला नहीं जा सकता परंतु घोल में उसको आसानी से समायोजित किया जा सकता है।

9.10 घोलों के हिमांक और क्वथनांक

सामान्यत: घोलों के हिमांक को घटाया जा सकता है और क्वथनांक को बढ़ाया जा सकता है। निम्नलिखित प्रयोग द्वारा इसे दिखाया जा सकता है।

प्रयोग 10.

पहले शुद्ध पानी का हिमांक और क्वथनांक निश्चित कर लीजिए और फिर पानी मे चीनी और नमक के घोल के यही अंक निर्धारित कर लीजिए। आप देखेंगे कि घोल का हिमांक शुद्ध पानी के हिमांक से नीचा है और शुद्ध पानी के क्वथनांक से घोल का क्वथनांक ऊँचा है। अन्य विलेय और विलायक ले-ले कर इसी प्रयोग को दोहराइए।

हम यह देखते है कि जो विलेय विद्युत अपघट्य नहीं होते, उनके हिमांक का नीचा करना और क्वथनांक का ऊँचा करना विलायक में विलेय की एक निश्चित मात्रा के समानुपात में होता है।

संक्षेप

घोल दो या अधिक पदार्थों का समांगी मिश्रण होता है।

विलेय वह पदार्थ है जो उस पदार्थ के साथ घुलता है जो उससे अधिक मात्रा में होता है।

विलायक वह पदार्थ है जो दूसरे को घुलाता है।

किसी पदार्थ की निश्चित तापमान पर *विलयशीलता* उसकी वह अधिकतम मात्रा है, जो उस तापमान पर 100 ग्राम जल के घोल में समा सकती है।

विलयशीलता तापमान के साथ बदलती है।

भिन्न-भिन्न तापमानों पर पदार्थों की विलयशीलताएँ *विलयशीलता वक्र रेखाओं* पर दिखाई जा सकती हैं।

द्रवों में ठोसों की विलयशीलता सामान्यत: तापमान के साथ बढ़ जाती है।

गैसें ठंडे पानी में गर्म पानी की अपेक्षा अधिक घुलनशील होती हैं।

संतृप्त घोल में निश्चित तापमान पर विलायक के निश्चित आयतन में विलेय की अधिकतम मात्रा समायी होती है। जिस घोल में अधिकतम मात्रा से कम विलेय होता है, वह घोल *असंतृप्त घोल* कहलाता है और जिसमें अधिक विलेय होता है, वह *अतिसंतृप्त घोल* कहा जाता है। जब संतृप्त घोल

को ठंडा कर दिया जाता है तो उसमें से विलेय के क्रिस्टल निकल जाते हैं। असंतृप्त और अतिसंतृप्त घोलों के साथ ऐसा नहीं होता।

सभी ठोस सभी द्रवों में नहीं घुल जाते।

द्रव मिश्रणीय भी होते हैं और अमिश्रणीय भी।

विलयशीलता=प्रति लिटर संतृप्त घोल का सांद्रण

=प्रति लिटर घोल में विलेय का अधिकतम भार, ग्रामों में

शुद्ध विलायक की अपेक्षा घोल का हिमांक नीचा होता है।

घोल का क्वथनांक शुद्ध विलायक से ऊँचा होता है।

दोहराने के लिए प्रश्न

1. घोल क्या होता है? अपने उत्तर को उदाहरण देकर स्पष्ट कीजिए।

2. इनका अर्थ बताइए और उदाहरण दीजिए :

(क) विलेय, (ख) विलायक

3. बताइए कि संतृप्त घोल क्या होता है? पानी में विलेय का संतृप्त घोल कैसे बनाया जा सकता है? पोटासियम नाइट्रेट का उदाहरण देकर समझाइए।

4. संतृप्त घोल असंतृप्त घोल और अतिसतृप्त घोल से किस प्रकार भिन्न होता है?

5. विलयशीलता का अर्थ समझाइए। यह बताइए कि इसका निर्धारण कैसे होता है? किसी घोल का तापमान 25 डिग्री सें० है और उसमें 5 ग्राम विलेय 200 सी० सी० पानी में मिला हुआ है। 25 डिग्री सें० पर अधिक विलेय इस घोल में नही घुल सकता। 25 डिग्री सें० पर विलेय की विलयशीलता का हिसाब लगाइए।

6. उन विलायकों के नाम लीजिए जिनमें नाइटर, सल्फर और आयोडीन घुल जाते हैं।

7. पानी 0 डिग्री सें० पर जमता है और 100 डिग्री से० पर खौलता है। यह बताइए कि पानी में चीनी घोल देने से शुद्ध पानी के हिमांक और क्वथनांक पर क्या प्रभाव पड़ेगा।

8. तापमान का इन पर क्या असर होता है :

(क) पानी में ठोस की विलयशीलता पर, (ख) पानी में गैस की विलयशीलता पर।

9. घोलों के महत्व को स्पष्ट कीजिए। इनके तीन महत्वपूर्ण उपयोग बताइए।

अध्याय 10

द्रव्य में परिवर्तन और रासायनिक समीकरण

10.1 परिवर्तन के प्रकार

प्रकृति में द्रव्य में निरंतर परिवर्तन होता रहता है। कुछ परिवर्तन *सरल* और *अस्थायी* होते हैं। इन परिवर्तनों को *भौतिक परिवर्तन* कहते हैं। नीचे इनके कुछ उदाहरणों के प्रयोग दिए गए हैं।

प्रयोग 1.

एक बीकर में कुछ पानी लीजिए। बीकर को नमक और बर्फ के मिश्रण से घेर दीजिए। पानी जम कर ठोस बर्फ बन जाएगा। अब बीकर को गर्म कीजिए। बर्फ पिघल कर फिर से पानी बन जाएगी। पानी को खौलने तक गर्म कीजिए। पानी वाष्प के रूप में बदल जाएगा, जिसे भाप कहते है। भाप को किसी ठंडे जार में पहुँचाइए। भाप संघनित होकर पानी बन जाएगी। आप देखेंगे कि इस प्रकार ऐसा कोई नया पदार्थ नहीं बनता जिसकी रचना नई हो, केवल अवस्था में ही अंतर पड़ता है।

प्रयोग 2.

पोरसीलेन की प्याली में थोड़ा-सा नमक लीजिए। उसमें थोड़ा पानी मिलाइए और काँच की छड़ से इसे हिलाइए। आप देखेंगे कि नमक पानी में घुल जाएगा और एक घोल बनेगा जो चखने में नमकीन होगा। इस घोल को खौलाइए। पानी वाष्पित हो जाएगा और प्याली में नमक अवशिष्ट रह जाएगा। *कोई भी नया पदार्थ नहीं बनेगा।*

प्रयोग 3.

एक परखनली लेकर उसमें आयोडीन का एक क्रिस्टल गर्म कीजिए। आप देखेंगे कि परखनली के ठंडे भागों में बैंजनी रंग का वाष्प संघनित हो जाएगा। जो वाष्प संघनित हुआ वह आयोडीन है। इस प्रकार कोई भी नया पदार्थ नहीं बना और केवल अवस्था में परिवर्तन हुआ।

कुछ और परिवर्तन भी होते हैं जो अधिक स्थायी और सामान्यतः अनुत्क्रमणीय होते हैं। जब मैग्नीशियम के फीते को चीनी की प्याली में गर्म किया जाता है तो उसकी सफेद राख बन जाती है। इस सफेद राख को ठंडा करके फिर से मैग्नीशियम के फीते में नहीं बदला जा सकता। इस प्रकार के परिवर्तनों को रासायनिक परिवर्तन कहते हैं। इन्हें चार महत्वपूर्ण प्ररूपों में विभाजित किया गया है :

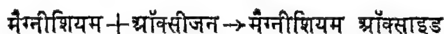
(1) *रासायनिक संयोजन*
(2) रासायनिक अपघटन
(3) *सरल विस्थापन*
(4) *द्वि-अपघटन*

आगे दिए गए प्रयोगों द्वारा इन परिवर्तनों को प्रदर्शित किया जा सकता है।

10.2 रासायनिक संयोजन

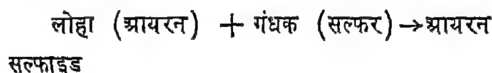
प्रयोग 4

मैग्नीशियम के फीते के एक टुकड़े को टांग्स से पकड़कर अदीप्त बुन्सन ज्वाला में रखकर बाहर निकाल लीजिए। आप देखेंगे कि यह आँखों को चकाचौंध कर देने वाले प्रकाश के साथ बराबर जलता रहेगा और उससे मैग्नीशियम ऑक्साइड का सफेद चूरा बनता जाएगा। मैग्नीशियम ऑक्सीजन से संयोजित होता है जिसमें ऊष्मा और प्रकाश निकलते हैं और मैग्नीशियम ऑक्साइड बनता है।


मैग्नीशियम + ऑक्सीजन → मैग्नीशियम ऑक्साइड

प्रयोग 5.

एक परखनली में थोड़ी-सी गंधक (सल्फर) लेकर उसे पिघलाइए और फिर उसमें कुछ लोहे की रेतनों के टुकड़े डालकर गर्म कीजिए। लोहा और गंधक (सल्फर) संयुक्त हो जाएँगे और गर्म करने पर इसमें से चिनगारियाँ निकलेंगी और आयरन सल्फाइड बन जाएगा।


लोहा (आयरन) + गंधक (सल्फर) → आयरन सल्फाइड

प्रयोग 6.

एक मजबूत और डाटदार गोला लीजिए। इसमें हाइड्रोजन और क्लोरीन गैसों का बराबर-बराबर मिश्रण लेकर इसे प्रकाश दिखाइए। दोनों गैसें मिल कर हाइड्रोजन क्लोराइड बनाएँगी।

(*सावधानी*—यह अभिक्रिया बहुत उग्र होती है, इसलिए प्रयोग रक्षात्मक पिंजरे में करना चाहिए।)

हाइड्रोजन क्लोराइड पानी में घुल जाता है और इससे सिल्वर नाइट्रेट घोल की अभिक्रिया करने पर सफेद रंग का अवक्षेप बन जाता है।


हाइड्रोजन + क्लोरीन → हाइड्रोजन क्लोराइड

प्रयोग 7.

3 आयतन : 1 आयतन के अनुपात में हाइड्रोजन और ऑक्सीजन लेकर इनके मिश्रण का विस्फोट कीजिए। इसके लिए चित्र-16 की तरह नली में फ्यूज किए हुए प्लैटिनम के तारों के बीच में बिजली की चिनगारी गुजारिए। यह काम पारे के ऊपर गैस आयतनमापी नली में होना चाहिए। ठंडा करने पर आयतन सिकुड़ेगा और पारे की सतह पर तथा नलकी की दीवारों पर पानी की बूँदें दिखाई पड़ेंगी। हाइड्रोजन ऑक्सीजन से मिलकर पानी बनाती है।


हाइड्रोजन + ऑक्सीजन → पानी

10.3 रासायनिक अपघटन

प्रयोग 8.

कठोर काँच की परखनली में थोड़ा-सा लाल सीसा गर्म कीजिए। नली में एक लाल गर्म शित-खंड या खपच्ची डालिए। यह शितखंड एकदम प्रज्वलित हो जाएगा जिससे यह पता चलता है कि ऑक्सीजन निकली है। परखनली में पीले रंग का लिथार्ज अवशिष्ट रह जाएगा। यह ऊष्मा द्वारा रासायनिक अपघटन का एक उदाहरण है। लाल सीसा ऑक्सीजन और लिथार्ज में अपघटित हो जाता है।


लाल सीसा → लिथार्ज + ऑक्सीजन

प्रयोग 9.

एक परखनली में पानी में विलंबित थोड़ा-सा सिल्वर ब्रोमाइड लीजिए। नली को डाट लगाकर धूप में रख दीजिए। अब रंग के परिवर्तन की ओर ध्यान दीजिए। पीला-सा सफेद रंग बदल कर गहरा धूसर रंग हो जाएगा। धूसर रंग धात्विक चाँदी के बनने के कारण आता है, जो बहुत बारीक-बारीक

शक्ल में होती है। सिल्वर ब्रोमाइड का प्रकाश द्वारा अपघटन हो जाता है।

सिल्वर ब्रोमाइड→सिल्वर+ब्रोमाइड

प्रयोग 10

जैसा कि चित्र-17 में दिखाया गया है, एक वोल्टामीटर में अम्लीकृत पानी में से बिजली की धारा गुजारिए। पानी अपघटित हो जाएगा और दोनों गैसें दो नलकियों में जमा हो जाएँगी। जो दहन में सहायक होगी वह ऑक्सीजन गैस है और दूसरी जो स्वयं जलती है वह हाइड्रोजन है।

पानी→हाइड्रोजन+ऑक्सीजन

प्रयोग 11.

एक परखनली में ताँबे के एक टुकड़े पर सांद्रित नाइट्रिक एसिड की कुछ बूंदें गिराइए। ऐसा करने से लाल भूरे रंग के धूम निकलेंगे और हरे रंग का कॉपर नाइट्रेट का घोल बन जाएगा। ताँबे के स्पर्श मात्र से नाइट्रिक एसिड अपघटित हो जाती है और गर्मी पैदा होती है।

कॉपर+नाइट्रिक एसिड→कॉपर नाइट्रेट+नाइट्रोजन पैराऑक्साइड के लाल से भूरे रंग के धूम

10.4 सरल विस्थापन

प्रयोग 12.

जैसा कि चित्र-40 में दिखाया गया है, लोहे की एक कील लेकर उसे कॉपर सल्फेट में छोड़ दीजिए। लोहे की इस कील पर लाल रंग का ताँबा जमा होने लगेगा।

कॉपर सल्फेट+लोहा→आयरन सल्फेट+ताँबा

यह सरल विस्थापन का एक उदाहरण हुआ।

10.5 द्वि-अपघटन

प्रयोग 13.

एक बीकर में सोडियम क्लोराइड (नमक) के घोल में कुछ सिल्वर नाइट्रेट का घोल डालिए। इससे सफेद अवक्षेप प्रगट होगा। छानने के बाद जो घोल प्राप्त होगा उसमें सोडियम नाइट्रेट होगा।

सोडियम क्लोराइड+सिल्वर नाइट्रेट→सिल्वर क्लोराइड +सोडियम नाइट्रेट

यह द्वि-अपघटन का उदाहरण है।

10.6 रासायनिक परिवर्तन के अभिलक्षण और स्थितियाँ

ऊपर के प्रयोगों में रासायनिक परिवर्तन के अभिलक्षण और स्थितियाँ दी गई हैं। ये इस प्रकार हैं:

(क) *अभिलक्षण*

i) एक या अधिक नए पदार्थ इन पदार्थों के अणुओं के अपघटन या उनके भागों की पुनर्व्यवस्था से बनते हैं।

ii) ऊष्मा या तो निकलती है या अवशोषित होती है।

iii) कुछ में प्रकाश भी निकलता है।

(ख) *रासायनिक परिवर्तनों को प्रभावित करने वाली स्थितियाँ*

i) ऊष्मा

ii) प्रकाश

iii) विद्युत

iv) निकट संस्पर्श

आघात और विस्फोट से भी रासायनिक परिवर्तन होते हैं। यह कुछ विशेष मामलों में ही बताया जाएगा।

10.7 रासायनिक समीकरण

रासायनिक समीकरणों का उद्देश्य रासायनिक परिवर्तन या अभिक्रिया को परिणामात्मक रीति से संक्षिप्त रूप में प्रस्तुत करना है। नीचे कुछ सरल उदाहरण दिए जाते हैं :

i) हाइड्रोजन ऑक्सीजन में जलती है और इससे पानी बनता है। इस अभिक्रिया को प्रतीक रूप में इस प्रकार लिखा जाता है।



$$2H_2 + O_2 \rightarrow 2H_2O$$

हाइड्रोजन ऑक्सीजन जल
(2 अणु) (1 अणु) (2 अणु)

ii) रैड लेड या लाल सीसा गर्म होने पर लिथार्ज और ऑक्सीजन में अपघटित होता है। इस अभिक्रिया को यों लिखा जाता है :



$$2Pb_3O_4 \rightarrow 6PbO + O_2$$

लाल सीसा लिथार्ज ऑक्सीजन
(2 अणु) (6 अणु) (1 अणु)

iii) जस्त और सल्फ्यूरिक एसिड की अभिक्रिया से हाइड्रोजन और जिंक सल्फेट बनते हैं। इस अभिक्रिया को इस प्रकार लिखा जाता है :



$$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$$

जस्त सल्फ्यूरिक एसिड जिंक सल्फेट हाइड्रोजन
(1 अणु) (1 अणु) (1 अणु) (1 अणु)

iv) जब नमक के घोल में सिल्वर नाइट्रेट डाला जाता है तो सिल्वर क्लोराइड का सफेद अवक्षेप बन जाता है और सोडियम नाइट्रेट घोल के रूप में रह जाता है। इस अभिक्रिया को यों लिखा जाता है:

$$AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$$

सिल्वर नाइट्रेट सोडियम क्लोराइड सिल्वर क्लोराइड सोडियम नाइट्रेट
(1 अणु) (1 अणु) (1 अणु) (1 अणु)

10.8 रासायनिक समीकरण कैसे लिखे और संतुलित किए जाते हैं

ऊपर जो उदाहरण दिए गए हैं, रासायनिक समीकरण उनसे अधिक जटिल होते हैं। इनके लिखने और संतुलित करने में इन बातों को ध्यान में रखा जाता है :

(1) प्रयोग संबंधी तथ्यों को सही-सही लिखा जाता है अर्थात अभिकारकों और परिणामियों का ठीक पता होना चाहिए।

(2) अभिकारकों को अर्थात उन पदार्थों को बाईं ओर लिखा जाता है जो अभिक्रिया करते हैं और परिणामियों को अर्थात जो उत्पाद बनाते हैं उनको तीर या बराबरी के चिह्न के दाईं ओर लिखा जाता है।

(3) अभिकारकों और परिणामियों को उनके आणविक सूत्रों के रूप में लिखा जाता है।

(4) समीकरण को संतुलित करने के लिए सूत्र से पहले संतुलित करने वाले समाकल अंक लिखे जाते है जिन्हें गुणांक कहते हैं। ऐसा इसलिए किया जाता है कि बाईं ओर के परमाणुओं की कुल संख्या दाईं ओर के परमाणुओं की कुल संख्या के बराबर हो जाए।

इन बातों को पोटासियम क्लोरेट के ऊष्मा द्वारा अपघटन संबंधी समीकरण में समझाया गया है।

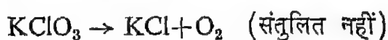
(क) पोटासियम क्लोरेट पोटासियम क्लोराइड और ऑक्सीजन में अपघटित होता है। पोटासियम क्लोरेट अभिकारक है और पोटासियम क्लोराइड तथा ऑक्सीजन परिणामी उत्पाद हैं।

(ख) पोटासियम क्लोरेट, पोटासियम क्लोराइड और ऑक्सीजन के आणविक सूत्र हैं :



$KClO_3$, KCl और O_2

इसका समीकरण यह है :



$$KClO_3 \rightarrow KCl + O_2 \quad \text{(संतुलित नहीं)}$$

पोटासियम क्लोरेट के 2 अणु लेने से समीकरण बन जाता है :



$$2\,KClO_3 \rightarrow 2\,KCl + 3O_2 \quad \text{(संतुलित)}$$

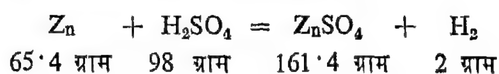
गुणांक अभिक्रिया करने वाले अथवा उत्पन्न होने वाले अणुओं की संख्या बताते हैं। संतुलित समीकरण का अर्थ यह होता है कि पोटासियम क्लोरेट के दो अणु अपघटित होकर पोटासियम क्लोराइड के दो अणु व ऑक्सीजन के तीन अणु बनाते हैं।

क्योंकि अणु ग्रामों में निश्चित भार को भी प्रगट करते हैं, इसलिए हम जानते हैं कि अभिकारकों और उत्पादों में भार के अनुसार क्या समानुपात हैं। इस प्रकार अभिक्रिया में भाग लेने वाले पदार्थों के भारों का परिकलन किया जा सकता है, किन्तु उन समीकरणों में जोकि यहाँ दिए गए हैं प्राप्त होने वाली अथवा खोई जाने वाली ऊर्जा का कोई हिसाब नहीं लगाया गया है। रासायनिक अभिक्रियाओं में ऊर्जा के जो परिवर्तन होते हैं उस प्रश्न को रसायन की ऊँची पुस्तकों में लिया जाएगा। किन्तु यहाँ रासायनिक समीकरणों पर आधारित परिकलनों के कुछ उदाहरण दिए जा रहे हैं।

उदाहरण–1

यदि दो ग्राम जस्त (जिंक) की अधिक मात्रा में सल्फ्यूरिक एसिड से अभिक्रिया की जाए तो बताइए कि इससे बनने वाले जिंक सल्फेट का कितना भार होगा। यह भी मालूम कीजिए कि जो सल्फ्यूरिक एसिड काम में आई उसका भार कितना था।

जस्त और सल्फ्यूरिक एसिड की अभिक्रिया होने से जिंक सल्फेट और हाइड्रोजन बनते हैं। इस अभिक्रिया का समीकरण यह है :



$$Zn + H_2SO_4 = ZnSO_4 + H_2$$

65·4 ग्राम   98 ग्राम   161·4 ग्राम   2 ग्राम

इस प्रकार 65·4 ग्राम जस्त 98 ग्राम सल्फ्यूरिक एसिड से अभिक्रिया करता है, जिससे 161·4 ग्राम जिंक सल्फेट और 2 ग्राम हाइड्रोजन बनती है।

2 ग्राम जस्त से उत्पादित जिंक सल्फेट—

$$= \frac{161 \cdot 4}{65 \cdot 4} \times 2$$

$$= 4 \cdot 93 \text{ ग्राम}$$

और उपयुक्त सल्फ्यूरिक एसिड का भार—

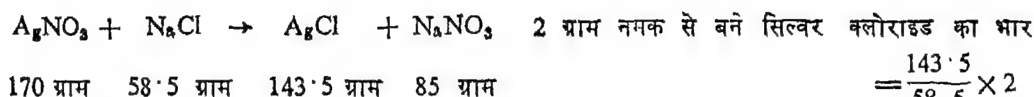
$$= \frac{98}{65 \cdot 4} \times 2$$

$$= 2 \cdot 99 \text{ ग्राम}$$

उदाहरण–2

उस सिल्वर क्लोराइड का भार मालूम कीजिए जो 2 ग्राम नमक से बनेगा। यह भी बताइए कि इसके लिए जो सिल्वर नाइट्रेट काम आएगा उसका कितना भार होगा।

अभिक्रिया का समीकरण यह होगा :



$$AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$$

170 ग्राम 58·5 ग्राम 143·5 ग्राम 85 ग्राम

इस प्रकार 170 ग्राम सिल्वर नाइट्रेट 58·5 ग्राम नमक से अभिक्रिया करता है और इससे 143 5 ग्राम सिल्वर क्लोराइड और 85 ग्राम सोडियम नाइट्रेट बनेगा।

2 ग्राम नमक से बने सिल्वर क्लोराइड का भार

$$= \frac{143 \cdot 5}{58 \ 5} \times 2$$

$$= 4 \ 9 \text{ ग्राम}$$

और इसके लिए आवश्यक सिलवर नाइट्रेट का भार

$$= \frac{170}{58 \cdot 5} \times 2$$

$$= 5 \ 81 \text{ ग्राम}$$

संक्षेप

द्रव्य में दो प्रकार के परिवर्तन होते हैं (1) *भौतिक परिवर्तन* और (2) *रासायनिक परिवर्तन*। *भौतिक परिवर्तन* अस्थायी होता है।

रासायनिक परिवर्तन स्थायी परिवर्तन होता है। यह परिवर्तन ऊष्मा, प्रकाश, विद्युत, निकट संस्पर्श से और आघात तथा विस्फोट से भी होता है। रासायनिक परिवर्तन से कम से कम एक नया पदार्थ अवश्य बनता है।

रासायनिक प्रक्रिया में प्राय: तापमान में परिवर्तन अवश्य होता है (या तो रासायनिक परिवर्तन के दौरान ऊष्मा निकलती है या उसका अवशोषण होता है)।

रासायनिक संयोजन एक रासायनिक परिवर्तन है जिसमें दो या अधिक पदार्थों के संयोजन से एक नया पदार्थ बनता है।

रासायनिक अपघटन भी रासायनिक परिवर्तन है जिसमें एक पदार्थ के विघटन से दो या अधिक नए पदार्थ बनते है।

सरल *विस्थापन* एक रासायनिक परिवर्तन है जिसमें एक पदार्थ का कोई एक मूलतत्व दूसरे मूलतत्व द्वारा विस्थापित कर दिया जाता है और एक नया पदार्थ बन जाता है।

द्वि-अपघटन वह रासायनिक परिवर्तन है जिसमें किसी घोल में दो पदार्थ अपने-अपने साथियों का आदान-प्रदान कर लेते हैं।

रासायनिक समीकरण अभिकारकों और परिणाभियों का वह मात्रात्मक संबंध है, जो उनके अणु सूत्रों के रूप मे व्यक्त किया जाता है।

अभिकारक वे पदार्थ हैं जो किसी अभिक्रिया में भाग लेते हैं। *परिणामी* वह पदार्थ हैं जो अभिक्रिया से उत्पन्न होते हैं।

दोहराने के लिए प्रश्न

1. उन परिवर्तनों के प्रकार बताइए जो द्रव्य में होते है ? उदाहरण देकर अपने उत्तर को स्पष्ट कीजिए ।

2. रासायनिक परिवर्तन के अभिलक्षण बताइए और उदाहरण दीजिए । चार ऐसे उदाहरण दीजिए जिनसे यह प्रगट हो कि द्रव्य में जो रासायनिक परिवर्तन होते हैं उनसे नए पदार्थ बनते हैं ।

3. रासायनिक संयोजन क्या होता है ? इसके कम से कम दो उदाहरण दीजिए ।

4. रासायनिक अपघटन क्या होता है ? यह कैसे होता है ? इसको समझाने के लिए कम-से-कम दो उदाहरण दीजिए ।

5. सरल विस्थापन क्या होता है ? दो उदाहरण देकर स्पष्ट कीजिए ?

6. द्वि-अपघटन का क्या अर्थ होता है ? इसके लिए भी दो उदाहरण दीजिए ।

7. वे कौन-सी स्थितियाँ हैं जिनका रासायनिक परिवर्तन पर प्रभाव पड़ता है ? उदाहरण देकर इस बात को स्पष्ट कीजिए ।

8. जब ऐसा होता है तो किस प्रकार का परिवर्तन होता है :

i) आयोडीन को गर्म किया जाता है ।

ii) लाल सीसा (रैड लेड) गर्म किया जाता है ।

iii) अम्लीकृत पानी में विद्युत गुजारी जाती है ।

iv) सिल्वर नाइट्रेट घोल में जस्त की छड़ रखी जाती है ।

v) सिल्वर नाइट्रेट घोल में हाइड्रोक्लोरिक एसिड डाला जाता है ।

vi) गंधक को वायु में जलाया जाता है ।

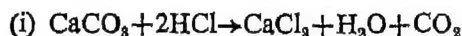
vii) पिघली हुई गंधक में लोहे की रेतनें डाली जाती हैं ।

viii) चूने का पत्थर गर्म किया जाता है ।

ix) संगमरमर और हाइड्रोक्लोरिक एसिड को मिलाया जाता है ।

9. रासायनिक समीकरण रासायनिक परिवर्तनों को मात्रात्मक रूप में व्यक्त करते हैं । इस कथन को उदाहरण देकर समझाइए ।

10. बताइए कि इस व्यंजक में क्या बात निहित है :


(i) $CaCO_3+2HCl \rightarrow CaCl_2+H_2O+CO_2$


(ii) $2NH_4Cl+2KNO_2 \rightarrow 2KCl+2N_2+4H_2O$

11. रासायनिक समीकरणों को कैसे लिखा और संतुलित किया जाता है। एक उदाहरण देकर अपना उत्तर स्पष्ट कीजिए।

12. यदि 0·12 ग्राम मैग्नीशियम के फीते को ऑक्सीजन में पूरी तरह भस्म कर दिया जाता है तो इससे बनने वाले उत्पाद का भार निकालिए।

13. उस हाइड्रोक्लोरिक एसिड का भार निकालिए जो 2 ग्राम कैल्सियम कार्बोनेट को पूर्णत: अपघटित करने के लिए आवश्यक होगी।

14. 2·45 ग्राम पोटासियम क्लोरेट से जो पोटासियम क्लोराइड बनगा, उसका भार मालूम कीजिए।

अध्याय 11

परमाणु भार, अणु भार, तुल्य भार और संयोजकता

11.1 परमाणु भार

मूलतत्व परमाणुओं से मिलकर बनते हैं जोकि बहुत ही सूक्ष्म होते हैं। इन परमाणुओं के वास्तविक भार तो इतने न्यून होते हैं कि रासायनिक परिकलनों में उनका प्रयोग नहीं हो सकता। अतः हमें रसायन-शास्त्र में उनके वास्तविक भार की अपेक्षा उनके सापेक्ष भार से अधिक दिलचस्पी होती है। इन सापेक्ष भारों को मूलतत्वों के रासायनिक *परमाणु भार* कहा जाता है। डाल्टन ने हाइड्रोजन यानी सबसे हल्के तत्व को मानक चुना। उसने और उसके बाद के कुछ रसायनज्ञों ने हाइड्रोजन के परमाणु भार को एक माना जबकि इसका वास्तविक भार ($1\cdot673 \times 10^{-24}$g) जैसा कि अब तक मालूम है बहुत ही कम होता है। उन्होंने अन्य तत्वों के भार की हाइड्रोजन के भार से तुलना की, और यह पाया कि ऑक्सीजन के परमाणु का भार हाइड्रोजन के परमाणु के भार का 15·88 गुना होता है। कई कारणों से हाइड्रोजन की अपेक्षा ऑक्सीजन को तत्व की दृष्टि से कहीं अधिक सुविधाजनक मानक पाया गया। एक अत्यंत महत्वपूर्ण कारण यह था कि ऑक्सीजन सबसे अधिक तत्वों के साथ संयुक्त होती है। अंतर्राष्ट्रीय करारों द्वारा इसका भार 16·00 निर्धारित किया गया। ऑक्सीजन को मानक (=16·00) मानकर हाइड्रोजन का भार 1·008 होता है। *किसी भी मूलतत्व के परमाणु भार की परिभाषा इस प्रकार की गई कि यह उस मूलतत्व के एक परमाणु का ऑक्सीजन के एक परमाणु के भार से संबंधित भार है और ऑक्सीजन का भार 16·00 है।* आजकल कार्बन (=12) मानक माना जाता है। इससे कोई खास अंतर नहीं पड़ता। परमाणु भार एक संख्या है और जब यह ग्रामों में प्रगट किया जाता है तो यह *ग्राम-परमाणु भार* या *ग्राम-परमाणु* कहलाता है।

कुछ आम मूलतत्वों के परमाणु भार ऑक्सीजन (=16·00) के आधार पर नीचे दिए गए हैं।

मूलतत्व	प्रतीक	परमाणु भार
ऑक्सीजन	O	16·000
हाइड्रोजन	H	1·008
नाइट्रोजन	N	14·008
कार्बन	C	12·011

मूलतत्व	प्रतीक	परमाणु भार
सल्फर	S	32·066
फॉस्फोरस	P	30 975
क्लोरीन	Cl	35 457
सोडियम	Na	22·991
पोटासियम	K	39·100
मैग्नीशियम	Mg	24 32
कैल्सियम (चूना)	Ca	40·08
लोहा	Fe	55·85
ताँबा	Cu	63·54
सिल्वर	Ag	107·88
सोना	Au	197·00
जिंक (जस्त)	Zn	65·38
पारा	Hg	200·61
ऐल्युमिनियम	Al	26·98
टिन	Sn	118·70
सीसा	Pb	207 21

नोट : कार्बन (=12) के आधार पर परमाणु भार ऊपर दिए हुए मानों को $\frac{12}{12{\cdot}011}$ से गुणा करके निकाले जा सकते हैं।

11.2 अणु भार

हम यह पढ़ चुके है कि अणु परमाणुओं का एक समूह होता है। किसी मूलतत्व के अणु में एक ही प्रकार के एक या अधिक परमाणु होते हैं किन्तु किसी यौगिक के एक अणु में भिन्न प्रकार के परमाणु दो-दो या इससे अधिक के समूह में रहते हैं। एक अणु का भार उसमें मौजूद परमाणुओं के कुल भार के बराबर होता है। क्योंकि परमाणु-भार सापेक्ष होते हैं, इसलिए अणु भार भी सापेक्ष रहते हैं। *किसी पदार्थ के अणु भार की परिभाषा इस प्रकार की जा सकती है कि यह उस पदार्थ के अणु का हाइड्रोजन (1·008) के एक परमाणु या ऑक्सीजन (16·00) के परमाणु या कार्बन (12·00) के एक परमाणु के भार से संबंधित भार है।* अणु भार एक संख्या है। जब इसे ग्रामों में प्रगट किया जाता है तो इसे पदार्थ का ग्राम-अणु भार या ग्राम-अणु या *'मोल'* (mole) कहा जाता है। पदार्थ के अणु सूत्र में जितने परमाणु होते हैं उनके भार को जोड़ लेने से उस पदार्थ का अणु भार निकल आता है। नीचे लिखे सरल उदाहरणों से यह बात समझाई जा सकती है।

(i) पानी के अणु में, जिसे H_2O लिखा जाता है, हाइड्रोजन के दो परमाणु और ऑक्सीजन का एक परमाणु होता है।

हाइड्रोजन का परमाणु भार = 1·008 और ऑक्सीजन का = 16·00

अतः पानी का अणु भार = $2 \times 1{\cdot}008 + 16{\cdot}00$
= 18·016

(ii) कार्बन डाइऑक्साइड अणु को इस प्रकार लिखा जाता है CO_2। इसमें कार्बन का एक परमाणु और ऑक्सीजन के दो परमाणु होते हैं। कार्बन का एक परमाणु भार = 12·011 और ऑक्सीजन का परमाणु भार = 16·00। इसलिए कार्बन डाइऑक्साइड का अणु भार = $12{\cdot}011 + 2 \times 16{\cdot}00 = 44{\cdot}011$।

(iii) नमक का अणु इस प्रकार लिखा जाता है NaCl। इसमें सोडियम का और क्लोरीन का एक-एक परमाणु होता है।

सोडियम का परमाणु भार = 22·99 और क्लोरीन का परमाणु भार = 35·45।

इस प्रकार नमक का अणु भार = $22{\cdot}99 + 35{\cdot}45 = 58{\cdot}44$

(iv) चूने के पत्थर का अणु इस प्रकार लिखा जाता है $CaCO_3$। इसमें कैल्सियम का एक परमाणु

कार्बन का एक परमाणु, और ऑक्सीजन के तीन परमाणु होते हैं।

कैल्सियम का परमाणु भार=40·08, कार्बन का परमाणु भार=12·011 और ऑक्सीजन का परमाणु भार=16·00

इस प्रकार चूने के पत्थर का अणु भार
$=40\cdot08+12\cdot011+3\times16\cdot00$
$=100\cdot091$

किसी भी पदार्थ के एक निश्चित भार में मोलों की जितनी संख्या होती है वह पदार्थ के ग्रामों में भार और *ग्राम-अणु* का अनुपात होती है अर्थात

$$Wg \text{ (ग्रामों में भार) में मोलों की संख्या} = \frac{Wg}{\text{ग्राम-अणु}}$$

उदाहरण

0·49 ग्राम H_2SO_4 में मोलों और मिलिमोलों की संख्या निकालिए। ($H=1\cdot008, S=32, O=16\cdot00$)

H_2SO_4 का सूत्र भार $=2\times1\cdot0088+32+4\times16=98$

अतः 0·49 ग्राम H_2SO_4 में मोलों की संख्या
$$=\frac{0\cdot49}{98}=0\cdot005$$

क्योंकि 1 मोल = 1000 मिलिमोल

अतः मिलिमोलो की संख्या $=0\cdot005\times1000$
$=5$ (उत्तर)

11.3 तुल्य भार और संयोजकता

तुल्य-भार एक और ऐसा पद है, जिसका बहुत बार प्रयोग होता है। मूलतत्व सदा अपने परमाणु भार के अनुसार ही संयोजित नहीं होते। यह इस कारण होता है कि भिन्न-भिन्न मूलतत्वों की संयोजन क्षमता भी भिन्न होती है। परमाणुओं की परस्पर संयोजन की क्षमता को *संयोजकता* कहते हैं। उदाहरणार्थ,

(i) क्लोरीन का एक परमाणु हाइड्रोजन के एक परमाणु से संयोजित होता है।

(ii) ऑक्सीजन का एक परमाणु हाइड्रोजन के दो परमाणुओं से संयोजित होता है।

(iii) नाइट्रोजन का एक परमाणु हाइड्रोजन के तीन परमाणुओं से संयोजित होता है।

(iv) कार्बन का एक परमाणु हाइड्रोजन के चार परमाणुओं से संयोजित होता है।

क्योंकि हाइड्रोजन की संयोजकता एक मान ली गई है, इसलिए क्लोरीन, ऑक्सीजन, नाइट्रोजन और कार्बन की संयोजकता 1, 2, 3 और 4 होती है। क्योंकि ऑक्सीजन के 8 भाग हाइड्रोजन के एक भाग से संयोजित होती है और ऑक्सीजन की संयोजकता 2 है, इसलिए, निम्न संबंध स्थिर किया जा सकता है।

$$\frac{\text{ऑक्सीजन का परमाणु भार}}{\text{सयोजकता}}=\frac{16}{2}=8$$

और 8 ऑक्सीजन का तुल्य भार कहलाता है।

$$\text{इस प्रकार} \quad \frac{\textit{परमाणु-भार}}{\textit{तुल्य भार}}=\textit{संयोजकता}$$

परमाणु भार/तुल्य भार वह पूर्णांक है, जो किसी मूलतत्व की संयोजकता होती है। इसकी परिभाषा यों की गई है कि यह वह *संख्या है जो यह बताती है कि हाइड्रोजन या अन्य किसी एक संयोजक तत्व के साथ दिए हुए तत्व के कितने परमाणु संयोजित होते हैं या उसके द्वारा विस्थापित होते हैं।*

किसी मूलतत्व का तुल्य भार उसके परमाणु भार को संयोजकता से भाग देकर मालूम किया जा सकता है। यदि हम कोई मानक स्थिर कर दें, तो सभी मूलतत्वों के तुल्यांक भी तुलनात्मक हो

जाएँगे। ऑक्सीजन क्योंकि एक क्रियाशील मूल-तत्व है अतः इसी को मानक मान लिया जाता है और इसका तुल्य भार 8 निर्धारित कर दिया जाता है।

इस प्रकार *किसी भी मूलतत्व के तुल्य भार की परिभाषा यों की जाती है कि यह वह संख्या है जो यह बताती है कि मूलतत्व के भार के अनुसार कितने भाग आक्सीजन के 8 भागों से या किसी भी मूलतत्व ($H=1{\cdot}008$, $Cl=35{\cdot}45$) के तुल्य भार से संयोजित होते हैं।*

जब तुल्य भार ग्रामों में व्यक्त किया जाता है तो इसे *ग्राम-तुल्य भार या ग्राम-तुल्यांक* कहते हैं।

इन सरल उदाहरणों से इस बात को समझाया जा सकता है।

1) 8 ग्राम ऑक्सीजन 1·008 ग्राम हाइड्रोजन से, और 1·008 ग्राम हाइड्रोजन 35·45 ग्राम क्लोरीन से संयोजित होती है।

∴ हाइड्रोजन का तुल्य भार=1·008
और क्लोरीन का तुल्य भार=35·45

2) 12 ग्राम मैग्नीशियम 8 ग्राम ऑक्सीजन से संयुक्त होता है

मैग्नीशियम का तुल्य भार=12

यह आवश्यक नहीं कि मूलतत्वों का तुल्य भार एक ही हो। कुछ तत्व जैसे Cu, Fe का एक से अधिक तुल्य भार होता है क्योंकि उनकी सयोज-कताएँ भी एक से अधिक होती हैं।

किसी भी एक मूलतत्व का तुल्य भार ही दूसरे मूलतत्व के तुल्य भार से अभिक्रिया करता है। इसे *तुल्यांक नियम* कहा जाता है।

तुल्य भार निकालने के कुछ सरल उदाहरण नीचे दिए जाते हैं।

उदाहरण *1*.

जब 2·32 ग्राम सिल्वर ऑक्साइड को बहुत गर्म किया गया तो उससे 2·16 ग्राम चाँदी अवशिष्ठ रहे। चाँदी का तुल्य भार निकालिए :

सिल्वर ऑक्साइड का भार 2·32 ग्राम
चाँदी का भार 2·16 ग्राम
संयोजित ऑक्सीजन का भार 2·32–2·16
=0·16 ग्राम

$$\text{चाँदी का तुल्य भार} = \frac{2{\cdot}16}{0{\cdot}16} \times 8 = 108$$

उदाहरण *2*.

0·24 ग्राम मैग्नीशियम ने हाइड्रोक्लोरिक एसिड में से 0·02 ग्राम हाइड्रोजन को विस्थापित किया। मैग्नीशियम का तुल्य भार मालूम कीजिए। हाइड्रोजन का तुल्य भार 1·008 है।

$$\text{मैग्नीशियम का तुल्य भार} = \frac{\text{मैग्नीशियम का भार}}{\text{हाइड्रोजन का भार}}$$

$$\times \text{हाइड्रोजन का तुल्य भार} = \frac{0{\cdot}24}{0{\cdot}02} \times 1{\cdot}008$$

$$= 12{\cdot}096$$

उदाहरण *3*.

सिल्वर क्लोराइड में 24·6 प्रतिशत क्लोरीन होता है तो चाँदी का तुल्य भार बताइए।

सिल्वर क्लोराइड में चाँदी का प्रतिशत 100–24·6
=75·4

$$\text{चाँदी का तुल्य भार} = \frac{75{\cdot}4}{24{\cdot}6} \times \text{क्लोरीन का तुल्य भार}$$

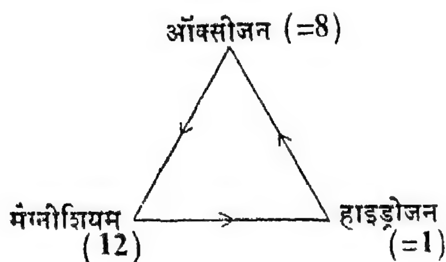
$$= \frac{75{\cdot}4}{24{\cdot}6} \times 35{\cdot}45$$

$$= 108{\cdot}6$$

तुल्य भार का विचार *तुल्यांक नियम* अथवा पारस्परिक समानुपातों के नियम से संबंध है। इस नियम से भार के अनुसार उन समानुपातों का

पता चलता है जिन समानुपातों में मूलतत्व एक-दूसरे-से संयोजित होते है या एक दूसरे को विस्थापित करते हैं। नीचे दो सरल उदाहरण दिए जा रहे हैं।

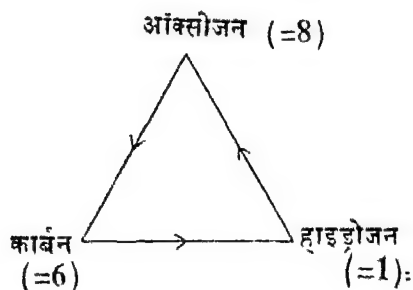
1) ऑक्सीजन हाइड्रोजन और मैग्नीशियम से संयोजित होती है और अम्लों में से मैग्नीशियम द्वारा हाइड्रोजन विस्थापित होती है। इस संबंध को यों दिखाया जा सकता है :



इस प्रकार :

ऑक्सीजन	:	मैग्नीशियम	: :	8:12
ऑक्सीजन	:	हाइड्रोजन	: :	8:1
मैग्नीशियम	:	हाइड्रोजन	: :	12:1

(ii) कार्बन, हाइड्रोजन और ऑक्सीजन एक-दूसरे-से संयोजित होते है और उनका संबंध नीचे दिया जाता है।



इस प्रकार :

हाइड्रोजन	:	ऑक्सीजन	: :	1:8
हाइड्रोजन	:	कार्बन	: :	1:6
कार्बन	:	ऑक्सीजन	: :	6:8

ऊपर के उदाहरणों से यह सिद्ध होता है कि दो मूलतत्व (क और ख) के भार जो तीसरे मूलतत्व (ग) के एक ही भार से अलग-अलग संयोजित होते है या उसे विस्थापित करते हैं, वे (क) और (ख) के वही भार है जो आपस में एक-दूसरे-से संयोजित होते या उन्हें विस्थापित करते हैं या उनके सरल गणज है। यही तुल्यांक या पारस्परिक समानुपात नियम है।

11.4 रासायनिक सूत्र कैसे व्युत्पन्न होते और लिखे जाते हैं

किसी अकार्बनिक यौगिक (ऑक्साइड, हाइड्राक्साइड, अम्ल, क्षारक या लवण) के दो भाग होते हैं, एक *धनात्मक भाग* होता है और दूसरा *ऋणात्मक भाग* होता है। प्रत्येक भाग की एक निश्चित संयोजकता (धनात्मक भाग के लिए + और ऋणात्मक भाग के लिए –) होती है और यह एक प्रतीक की भाँति लिखी जाती है। इसलिए किसी यौगिक के उदासीन अण का रासायनिक सूत्र, संयोजकताओं के विपरीत अनुपात में दोनों भागों के प्रतीकों का समूह होगा। नीचे के उदाहरणों से यह बात और स्पष्ट हो जाएगी।

(क) सोडियम सल्फेट के दो भाग होते हैं :

i) सोडियम जिसे Na^+ लिखा जाता है।

ii) सल्फेट जिसे $SO_4^{=}$ लिखा जाता है। इसलिए सोडियम सल्फेट के उदासीन अणु का रासा-

यनिक सूत्र होगा $Na_2(SO_4)$, या Na_2SO_4

(ख.) कैल्सियम कार्बोनेट के दो भाग होते हैं :

i) कैल्सियम जिसे लिखा जाता है Ca^{++}

ii) कार्बोनेट जिसे लिखा जाता है $caO_3^{=}$ इसलिए कैल्सियम कार्बोनेट के उदासीन अणु का रासायनिक सूत्र होगा $CaCO_3$।

किसी पदार्थ के सूत्र को जोकि परमाणुओं के सरलतम अनुपात को प्रगट करता है, सरलतम या मूलानुपाती सूत्र कहते हैं और वह सूत्र जो पदार्थ का अणु भार प्रगट करता है, अणु सूत्र कहलाता है।

अणु सूत्र = n × मूलानुपाती सूत्र

जहाँ n एक संख्या है =

$$\frac{\text{अणु सूत्र भार या अणु भार}}{\text{मूलानुपाती सूत्र भार}}$$

किसी अज्ञात यौगिक का मूलानुपाती सूत्र उसकी प्रतिशत संरचना से व्युत्पन्न होता है जो कि प्रयोगात्मक रूप से यौगिक के विश्लेषण द्वारा निर्धारित की जाती है। सूत्र की व्युत्पत्ति में निम्न बातें आती हैं :

(i) यौगिक में उपस्थित प्रत्येक मूलतत्व के प्रतिशत को उसके परमाणु भार से भाग दीजिए। इससे परमाणु अनुपात निकल आते हैं।

(ii) इन अनुपातों को उच्चतम समान गुणक से भाग देकर सरलतम समाकल अनुपात में घटाइए।

समाकल अनुपात सख्याओं सहित जो प्रतीक लिखे जाते हैं, उनसे ही मूलानुपाती सूत्र बनता है। निम्नलिखित उदाहरणों से बात समझ में आ जाएगी।

उदाहरण

किसी लवण में

Na=32·40 प्र० श०

S =22·53 प्र० श०

O =45·07 प्र० श०

Na, S, और O के परमाणु भार क्रमशः 23, 32 और 16 हैं। लवण का रासायनिक सूत्र निकालिए।

सोपान 1. परमाणु अनुपात है :

$$Na=\frac{32{\cdot}40}{23}=1{\cdot}40$$

$$S=\frac{22{\cdot}53}{32}=0{\cdot}70$$

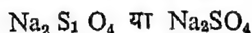
$$O=\frac{45{\cdot}07}{16}=2{\cdot}81$$

सोपान 2. परमाणु अनुपातों को समाकल अनुपातों में घटाया जाता है।

$$Na=\frac{1{\cdot}40}{0{\cdot}70}=2 \quad O=\frac{2{\cdot}81}{0{\cdot}70}=4 \text{ लगभग}$$

$$S=\frac{0{\cdot}70}{0{\cdot}70}=1$$

इस प्रकार लवण का मूलानुपाती सूत्र हुआ।



$Na_2 S_1 O_4$ या Na_2SO_4

पदार्थों के अणु सूत्र व्युत्पन्न करने के लिए उनके अणु भारों की आवश्यकता होती है, जो कई विधियों से निर्धारित किए जा सकते हैं, जिनका यहाँ उल्लेख संभव नहीं। अणु भार मूलानुपाती सूत्र भार का गुणक होता है।

$$\text{अर्थात्} \frac{\text{अणु भार}}{\text{मूलानुपाती सूत्र भार}}=n$$

इस बारे में विस्तार से विचार इस पुस्तक के भाग–3 में किया जाएगा जिसमें कार्बनिक यौगिकों पर विचार होगा।

संक्षेप

किसी मूलतत्व का *परमाणु-भार* वह संख्या है जो एक परमाणु के भार को ऑक्सीजन के एक परमाणु के भार के संबंध में प्रकट करती है जबकि ऑक्सीजन का परमाणु भार 16 माना जाता है ।

किसी मूलतत्व का एक *ग्राम-अणु* ग्रामों में बताया हुआ, उसका रासायनिक अणु भार होता है ।

परमाणु का *परम भार* तो बहुत कम होता है ।

किसी पदार्थ का *अणु भार* उस पदार्थ के एक अणु का ऑक्सीजन के एक परमाणु के भार (=16·00) से संबंधित भार होता है ।

अणु भार *सापेक्ष भार* है । यह एक संख्या होती है ।

ग्राम-अणु ग्रामों में दिया हुआ अणु-भार होता है । इसे मोल कहते हैं ।

किसी मूलतत्व का *तुल्य भार* मूलतत्व के उतने भागों की संख्या होती है जितने कि ऑक्सीजन के 8 भागों के साथ या अन्य किसी मूलतत्व के तुल्य भार से संयुक्त होते हैं (H=1·008, Cl=35·45) ।

ग्राम-तुल्य ग्रामों में दिया हुआ तुल्य भार होता है ।

इस अनुपात $\frac{\text{परमाणु भार}}{\text{तुल्य भार}}$ से मूलतत्व की *संयोजकता* मालूम होती है ।

पदार्थ *तुल्य समानुपातों* में अभिक्रिया करते हैं ।

एक पदार्थ का तुल्य भार दूसरे पदार्थ के तुल्य भार से अभिक्रिया करता है । इसे तुल्यांक नियम कहते हैं ।

तुल्यांक नियम अथवा अन्योन्य समानुपातों के नियम का संबंध भार के अनुसार उन समानुपातों से होता है, जिनमें मूलतत्व परस्पर संयोजित होते हैं या एक दूसरे को विस्थापित करते हैं ।

दोहराने के लिए प्रश्न

1. किसी मूलतत्व के परमाणुभार के अर्थ को स्पष्ट कीजिए ।
2. हम ऑक्सीजन (=16·00) को ही मूलतत्वों के परमाणु भार निश्चित करने के लिए मानक क्यों चुनते हैं और हाइड्रोजन (=1) को क्यों नहीं ?
3. ग्राम-परमाणु का क्या अर्थ होता है ? उदाहरण द्वारा अपने उत्तर को स्पष्ट कीजिए ।
4. बताइए कि किसी पदार्थ के अणु भार का क्या अर्थ होता है ?

5. 'ग्राम-अणु' और 'मोल' का क्या अर्थ होता है ? उदाहरण देकर स्पष्ट कीजिए।

6. इनके अणु भार बताइए :

   (i) H_2SO_4 (ii) $NaCl$ (iii) H_2O (iv) $Na_2CO_3 . 10H_2O$ (v) HNO_3 (vi) $AlCl_3$ (vii) $ZnCl_2$ (viii) $MgSO_4 . 7H_2O$.

7. यह बताइए कि किसी मूलतत्व के तुल्य भार का क्या अर्थ है ?

8. किसी मूलतत्व के परमाणु भार और तुल्य भार में क्या संबंध होता है ?

9. किसी मूलतत्व के ग्राम-तुल्यांक का क्या अर्थ होता है ? उदाहरण देकर स्पष्ट कीजिए।

10. किसी मूलतत्व की संयोजकता को आप उसके परमाणु भार और तुल्य भार की सापेक्षकता में कैसे बताएँगे ?

11. तुल्यांक नियम का वर्णन कीजिए। उदाहरण देकर समझाइए कि किस प्रकार इस नियम से हमें मूलतत्वों के तुल्य भार मालूम करने में सहायता मिलती है।

12. धातु के एक ऑक्साइड में 40 प्रतिशत ऑक्सीजन है। धातु का तुल्य भार निकालिए।

13. दो उदाहरण देकर इस कथन को स्पष्ट कीजिए कि दो मूलतत्वों (क) और (ख) के भार जो एक तीसरे मूलतत्व (ग) के उसी भार के साथ अलग-अलग संयोजित होते हैं या उसे विस्थापित करते हैं, (क) और (ख) के वही भार हैं जो एक दूसरे से संयोजित होते हैं या एक दूसरे को विस्थापित करते हैं। इसमें जो नियम लागू हुआ उसका नाम बताइए ?

14. रसायन-शास्त्र में द्रव्यमान का विचार क्यों आवश्यक है ? उदाहरण देकर उत्तर को स्पष्ट कीजिए।

15. संक्षेप में बताइए कि किसी पदार्थ के रसायनिक सूत्र की कैसे उत्पत्ति होती है और यह कैसे लिखा जाता है। उदाहरण देकर समझाइए।

अध्याय 12

परमाणुओं की बनावट

12.1 परमाणु की आधुनिक संकल्पना

डाल्टन ने परमाणुओं के बारे में जो विचार प्रस्तुत किया था उसमें पिछले सौ वर्षों में बहुत अधिक परिवर्तन हुआ है। अब परमाणुओं को अविभाज्य कण नहीं माना जाता। हम जानते हैं कि प्रत्येक परमाणु की अपनी एक विशेष संरचना होती है तथा यह और भी मौलिक कणों का बना होता है। इनमें से सबसे अधिक महत्वपूर्ण ये तीन हैं :

i) इलेक्ट्रान

ii) प्रोट्रान और

iii) न्यूट्रान

12.2 इलेक्ट्रान

इलेक्ट्रान ऋण आवेशी कण होते हैं जो आकार में अत्यंत सूक्ष्म होते हैं। प्रत्येक इलेक्ट्रान का भार हाइड्रोजन के परमाणु के भार का 1/1845 होता है और इसमें एक इकाई ऋण आवेश (unit negative charge) रहता है। विसर्जन नलिका (discharge tube) का प्रयोग करने वाले परीक्षण द्वारा इलेक्ट्रानों के अस्तित्व को सिद्ध किया जा सकता है।

प्रयोग 1

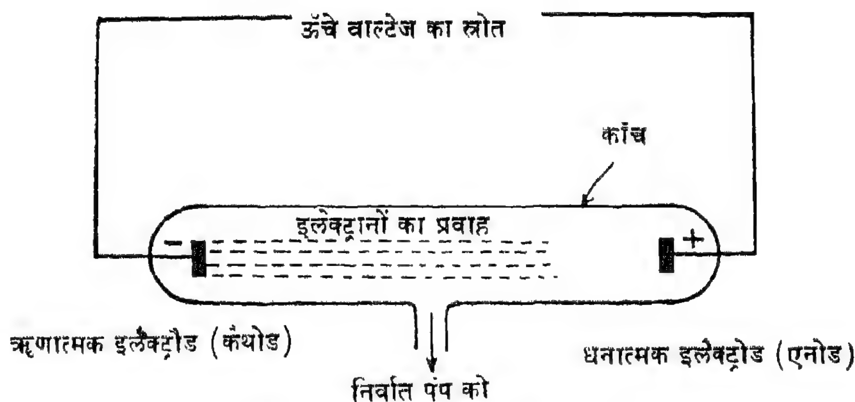
विसर्जन नलिका को जिसमें काँच की नली में धातु के दो इलेक्ट्रोड हों, चित्र–64 की तरह ऊँचे वोल्टेज के स्रोतों से जोड़िए।

नलिका को जितना संभव हो सके निर्वात कीजिए और इलेक्ट्रोडों के बीच में ऊँचे विभव की विद्युत धारा गुजारिए। आप देखेंगे कि ऋणी इलेक्ट्रोड (कैथोड) से नीले से रंग की प्रकाश की रेखाएँ निकलेंगी और धन इलेक्ट्रोड (एनोड) की ओर जाएँगे। कैथोड की ओर से किरणें सीधी निकलती दिखाई देंगी। यह जाकर नली के सामने की दीवार से टकराएँगी और इससे दीप्ति निकलेगी।

कैथोड किरणों के निम्नलिखित गुणों की ओर ध्यान दीजिए।

(i) जैसा कि चित्र–64 में दिखाया गया है कि यह सीधी रेखाओं में आगे बढ़ती है।

(ii) यदि इसके मार्ग में कोई वस्तु रख दी जाए तो चित्र–65 की तरह नली के दूसरे सिरे पर उसकी स्पष्ट छाया पड़ेगी।

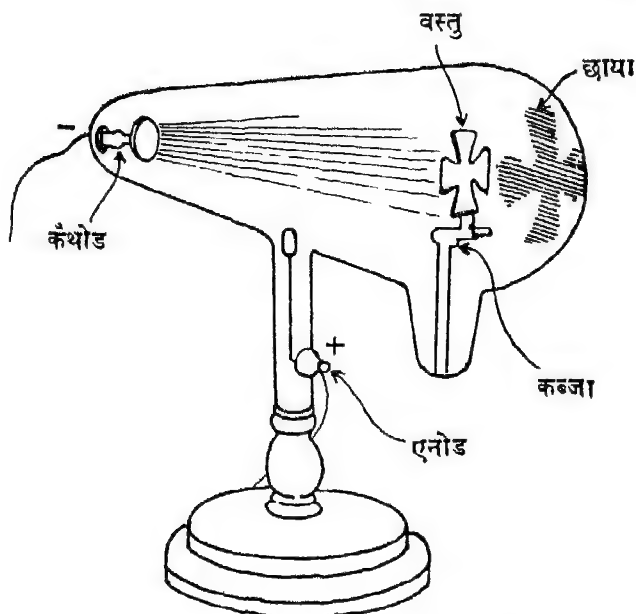


चित्र–64. कैथोड किरण की विसर्जन नलिका

(iii) इनके मार्ग में यदि बहुत हल्का क्षेपनी-चक्र या पैडल पहिया रख दिया जाए तो वह घूमने लगेगा।

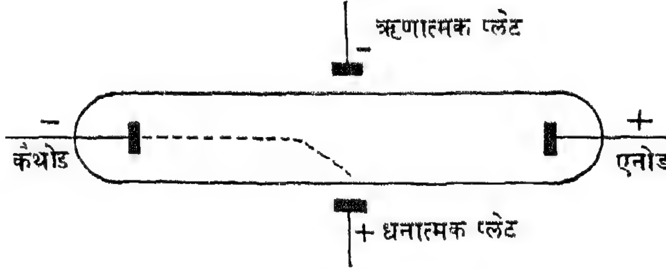
(iv) जब यह किरणें धातु के पत्नी के टुकड़े से टकराती हैं तो पत्नी गर्म हो जाती है।

(v) चुंबकीय अथवा विद्युत क्षेत्रों से विक्षेपित



चित्र–65. कैथोड किरणों से छाया बनती है।

हो जाती है। विक्षेप की वही विशेषता होगी, जो ऐसे अर्थात्, चुंबकीय अथवा विद्युत क्षेत्रों में से ऋण आवेशी कणों के गुजरने पर होती है जैसा कि चित्र–66 में दिखाया गया है।



चित्र–66. *ऋणी प्लेट से इलेक्ट्रान प्रतिकर्षित हैं और धनी प्लेट से आकर्षित होते हैं।*

कैथोड किरणों के उपर्युक्त गुणों को इस प्रकार बहुत अच्छी तरह समझाया जा सकता है कि ये किरणें पदार्थ के छोटे-छोटे कणों की धाराओं से मिलकर बनती हैं जो ऋण आवेशी होती हैं। इन कणों को इलेक्ट्रान कहते हैं। जब कुछ धातुओं को गर्म किया जाता है तो शीघ्र ही इलेक्ट्रान उत्पन्न हो जाते हैं और इस सिद्धांत का इलेक्ट्रानिक युक्तियों में प्रयोग किया जाता है।

सब परमाणुओं का इलेक्ट्रान एक भाग होता है और उन्हें किसी भी परमाणु से पृथक किया जा सकता है।

12.3 प्रोटान

प्रोटानों में धनी आवेश होता है। प्रत्येक प्रोटान में इकाई द्रव्यमान या हाइड्रोजन के परमाणु के लगभग बराबर द्रव्यमान होता है। प्रोटान भी सभी परमाणुओं मे होते हैं। पहली बार प्रोटानों को सन् 1886 में गोल्डस्टीन ने विसर्जन नलिका में देखा था जिसमें सछिद्र कैथोड था। प्रोटानों की किरणें कैथोड के छिद्रों में से गुजरती देखी गईं।

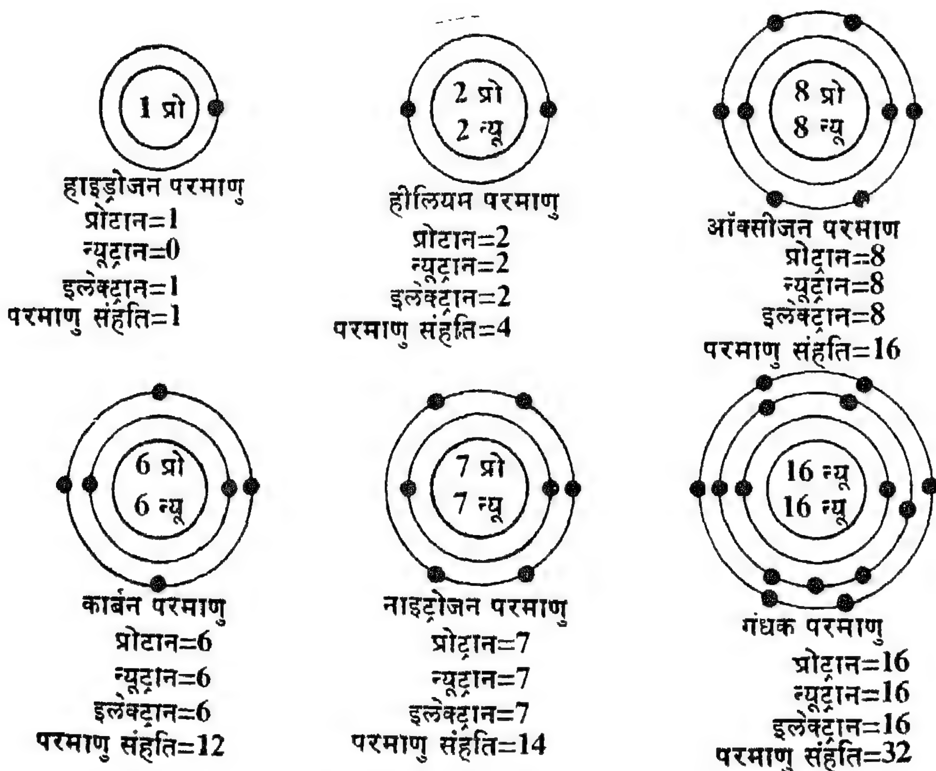
सन् 1919 में लार्ड रदरफोर्ड ने इस बात का पक्का प्रमाण प्रस्तुत किया कि परमाणुओं में प्रोटान होते हैं और जब नाइट्रोजन और ऐल्युमिनियम के परमाणुओं पर रेडियम से निकले हुए α कणों में बम्बारी की जाती है तो प्रोटान निकलते हैं।

12.4 न्यूट्रान

न्यूट्रान भी परमाणु संरचना की इकाइयाँ हैं। इनमें भी द्रव्यमान होता है किन्तु आवेश नहीं होता। इनकी खोज सन् 1932 में एक ब्रिटिश भौतिक विज्ञानी सर जेम्स चैडविक ने की थी।

यही तीन प्रकार के कण हैं जिनसे सभी ज्ञात परमाणु मिल कर बने होते हैं। इस प्रश्न पर इस शताब्दी के आरंभ में बहुत बिचार-विमर्श हुआ कि परमाणुओं में इन तीनों की क्या व्यवस्था होती है। रदरफोर्ड में इनकी व्यवस्था का एक चित्र प्रस्तुत किया और इसे नील्स-बोहर ने और परिवर्धित किया। रदरफोर्ड–बोहर संरचना को स्वीकार किया जा चुका है। इसके अनुसार प्रत्येक परमाणु में एक छोटा-सा केंद्रक होता है, जिसमें प्रोटान या न्यू-

ट्रान रहते हैं और यह धनी आवेशी होता है। प्रोटानों के कारण धनी आवेश होता है। केंद्रक के चारों ओर काफी स्थान रहता है। इस स्थान में केंद्रक के चारों ओर निश्चित कक्षाओं या कोष में इलेक्ट्रान रहते हैं। इन कक्षाओं के क्रम से K,L,M,N,O,P, नाम होते हैं। इन कक्षाओं में रहने वाले कुल इलेक्ट्रानों की संख्या केंद्रक में रहने वाले कुल प्रोटानों की संख्या के बराबर होती है। इसका परिणाम यह होता है कि परमाणु विद्युत-उदासीन रहता है और इसका द्रव्यमान केंद्रक में केंद्रित रहता है। *परमाणु द्रव्यमान* =प्रोटानों की संख्या+इलेक्ट्रानों की संख्या। परमाणु का जो नैट धनी आवेश होता है उससे मूलतत्व के *परमाणु क्रमांक* का पता चलता है। परमाणु क्रमांक=प्रोटानों की संख्या=कक्षा में इलेक्ट्रानों की संख्या। परमाणु की बनावट के इन लक्षणों को चित्र-67 में दिखाए गए सरल उदाहरणों द्वारा व्यक्त किया जा सकता है।



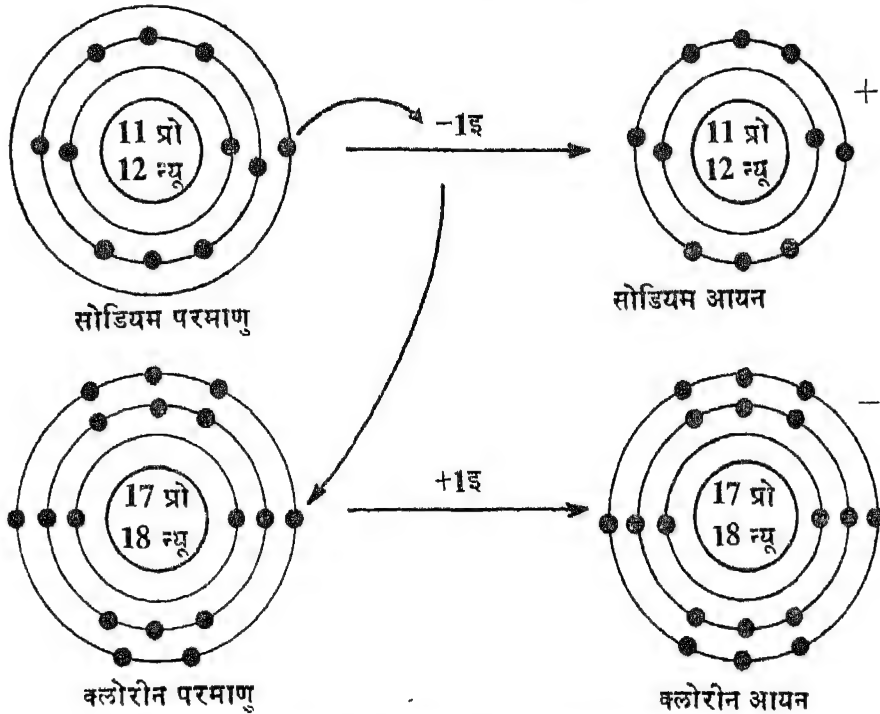
चित्र-67 *कुछ परमाणुओं की बनावट*

किसी भी मूलतत्व की कक्षा में इलेक्ट्रोनों की एक अधिकतम संख्या रह सकती है। यह इस प्रकार $2n^2$ में प्रकट की जाती है। इसमें n कक्षा की संख्या है।

इस प्रकार इलेक्ट्रानों की वह संख्या जो परमाणु की विभिन्न कक्षाओं में रह सकते हैं इस प्रकार है :

कक्षा	n का मूल्य	कक्षाओं में इलेक्ट्रानों की अधिकतम संख्या
K	1	$2\times1^2=2$
L	2	$2\times2^2=8$
M	3	$2\times3^2=18$
N	4	$2\times4^2=32$

बड़े परमाणुओं में भीतरी कक्षा बाहरी कक्षा के बनने से पहले ही पूरी हो जाती है। सबसे बाहर वाली कक्षा में 8 से अधिक इलेक्ट्रान नहीं हो सकते। और इससे भीतर वाली में 18 से अधिक इलेक्ट्रान नहीं हो सकते।



चित्र–68. इलेक्ट्रानों में स्थानांतरण द्वारा रसायनिक संयोजन

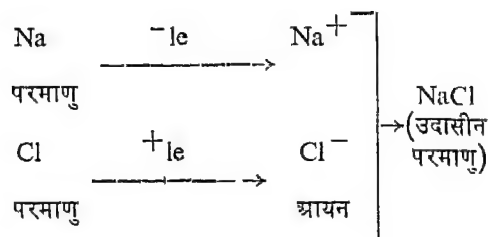
12.5 संयोजकता का इलेक्ट्रानिक सिद्धांत

अधिकांश रसायनिक अभिक्रियाओं में परमाणु के केवल सबसे बाहर के कक्षा के इलेक्ट्रान ही भाग लेते हैं। इसी कारण इन्हें संयोजकता इलेक्ट्रान कहा जाता है। जिन परमाणुओं की सबसे बाहरी कक्षा में 8 इलेक्ट्रान होते हैं, वे पर्याप्त निष्क्रिय होते हैं। उदाहरण के लिए Ne, A, Kr, Xe। हीलियम सबसे छोटी होती है और इसकी सबसे बाहरी कक्षा में केवल दो ही इलेक्ट्रान होते है, फिर

भी यह स्थायी होती है।

रसायनिक अभिक्रियाओं में सामान्य सिद्धांत यह लागू होता है कि परमाणु की सबसे बाहरी कक्षा में 8 इलेक्ट्रान पूरे करने की आवश्यकता होती है। हाइड्रोजन जैसे छोटे परमाणु के बारे में 2 इलेक्ट्रानों से ही काम चल जाता है। इससे स्थायित्व उत्पन्न होता है और यह दो प्रकार से हो सकता है।

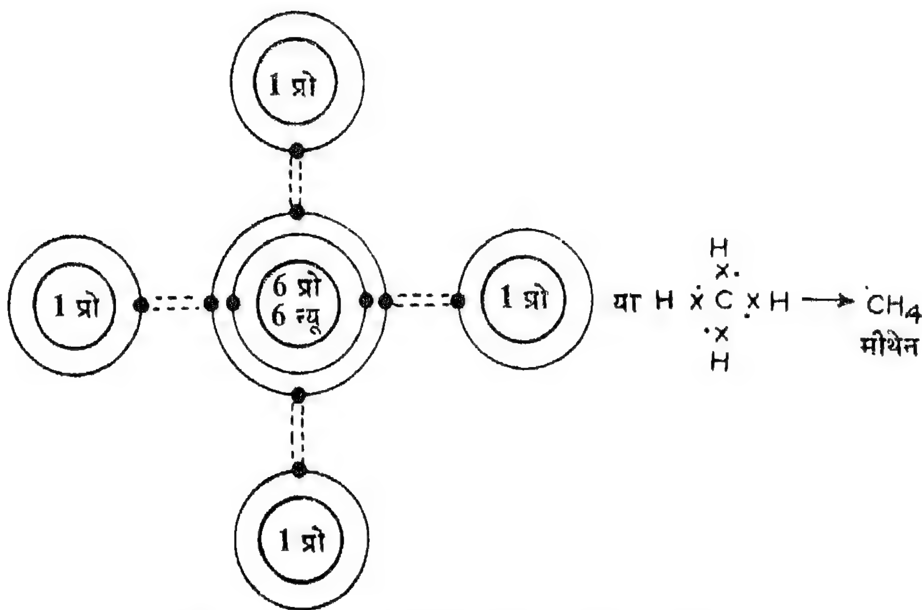
i) *इलेक्ट्रानों के स्थानांतरण से।* उदाहरण के लिए जैसा कि चित्र-68 में दिखाया गया है सोडियम क्लोराइड बनने में सोडियम व क्लोरीन संयोजित होते हैं। सोडियम (Na) का एक परमाणु एक इलेक्ट्रान होता है और क्लोरीन (Cl) का परमाणु यह एक इलेक्ट्रान पा लेता है। इस प्रकार इलेक्ट्रान का स्थानांतरण इस ढंग से होता है :



इस प्रकार के संयोजन को *वैद्युत संयोजन* कहते हैं और संयोजकता को *वैद्युत संयोजकता* कहते हैं।

ii) *इलेक्ट्रानों के आदान-प्रदान से।* उदाहरण के लिए कार्बन व हाइड्रोजन से मिलकर एक यौगिक मीथेन बनता है।

एक कार्बन परमाणु के चार इलेक्ट्रानों और चार हाइड्रोजन परमाणुओं के चार इलेक्ट्रानों का आदान-प्रदान उस ढंग से होता है जैसा कि चित्र-69 में दिखाया गया है।



चित्र-69. इलेक्ट्रान के आदान-प्रदान द्वारा रसायनिक संयोजन

इस प्रकार का संयोजन *सह संयोजन* कहलाता है और संयोजकता को *सह संयोजकता* कहते हैं।

संयोजकता की आधुनिक संकल्पना उपर्युक्त रसायनिक संयोजन के सिद्धांत पर आधारित है। किसी भी मूलतत्व की संयोजकता की संख्या उन इलेक्ट्रानों की संख्या है जो उस तत्व का परमाणु खोता, पाता या आदान-प्रदान करता है। आगे के उदाहरण से इसे समझाया जा सकता है:

(i) *सोडियम* **और क्लोरीन** *का संयोजन*। सोडियम का परमाणु एक इलेक्ट्रान खोता है और क्लोरीन का परमाणु यही एक इलेक्ट्रान प्राप्त कर लेती है, इसलिए सोडियम की संयोजकता एक है और क्लोरीन की भी एक ही है।

(ii) *कार्बन* **और** *हाइड्रोजन का संयोजन*। कार्बन का परमाणु अपने चार इलेक्ट्रान देता है और हाइड्रोजन के परमाणु के चार इलेक्ट्रान लेता है। इस प्रकार कार्बन की संयोजकता चार हुई।

संक्षेप

इलेक्ट्रान एक ऋणात्मक कण है, जिसका द्रव्यमान हाइड्रोजन परमाणु के 1/1845 के बराबर होता है। *प्रोटान* धनाविष्ट मौलिक कण होता है और इसका एकांक द्रव्यमान होता है।

न्यूट्रान विद्युत उदासीन कण होता है और इसका द्रव्यमान प्रोटान और इलेक्ट्रान के द्रव्यमानों के योग के बराबर होता है। इसका द्रव्यमान लगभग एकांक होता है।

किसी मूलतत्व का *परमाणु एकांक* उसके केंद्रक में उपस्थित न्यूट्रानों और प्रोटानों के जोड़ के बराबर होता है।

किसी *मूलतत्व का परमाणु क्रमांक* उतना ही होता है जितना केन्द्रक में प्रोटानों की संख्या होती है अथवा केन्द्रक के बाहर इलेक्ट्रानों की संख्या होती है। यही केन्द्रक का नेट (net) धनावेश होता है।

रदरफोर्ड **के** *न्यूक्लीय सिद्धांत में, जिसे बोहर ने परिवर्धित किया, कहा गया* **है :**

i) परमाणु में छोटा-सा संहत केन्द्रक होता है जिसमें प्रोट्रान और न्यूट्रॉन होते हैं और प्रोटानों के कारण इसमें धनावेश होता है।

ii) केन्द्रक के चारों ओर काफी अंतराल रहता है।

iii) इस अंतराल में इलेक्ट्रान निश्चित कक्षाओं में घूमते हैं।

iv) कक्षाओं में जो इलेक्ट्रान होते हैं, उनकी संख्या केन्द्रक में प्रोटानों की संख्या के बराबर होती है। इस प्रकार एक परमाणु विद्युत उदासीन होता है।

v) इलेक्ट्रान केन्द्रक से अपेक्षाकृत काफी दूर रहते हैं।

vi) परमाणु का कम-से-कम 99.9 प्र० श० द्रव्यमान केन्द्रक में रहता है। रसायनिक

अभिक्रियाएँ सबसे बाहरी कक्षा में इलेक्ट्रानों के स्थानांतरण या आदान-प्रदान के कारण होती हैं ।

इलेक्ट्रानों के स्थानांतरण से वैद्युत संयोजक बंधन उत्पन्न होता है । इलेक्ट्रानों के प्रदान-प्रदान से सह-संयोजक बंधन उत्पन्न होता है ।

किसी मूलतत्व का संयोजकता क्रमांक इलेक्ट्रानों की वह संख्या है जितनी में इलेक्ट्रान खोए या पाए जाते हैं या जितनों का आदान-प्रदान होता है ।

दोहराने के लिए प्रश्न

1. परमाणु में उपस्थित महत्वपूर्ण मौलिक कणों के नाम बताइए ।
2. इसका क्या अर्थ होता है :

   i) इलेक्ट्रान ii) प्रोटान iii) न्यूट्रान vi) परमाणु क्रमांक v) केन्द्रक
3. यह भी बताइए कि डाल्टन का परमाणु सिद्धांत क्यों परिवर्धित किया गया ।
4. परमाणु की रदरफोर्ड-बोह्र संकल्पना का वर्णन कीजिए । हाइड्रोजन, ऑक्सीजन, नाइट्रोजन, कार्बन, सल्फर और फॉस्फोरस के परमाणु के उदाहरण देकर इसे स्पष्ट कीजिए ।
5. संयोजकता की आधुनिक संकल्पना क्या है ? उदाहरण देकर समझाइए ।
6. क्या परमाणु वैद्युत उदासीन होता है । यदि हाँ तो क्यों ?
7. संयोजकता इलेक्ट्रान क्या होते हैं ? रसायनिक अभिक्रियाएँ कैसी होती हैं ? उदाहरण देकर अपने उत्तर को स्पष्ट कीजिए ।
8. निम्नलिखित परमाणुओं में इलेक्ट्रानों, प्रोटानों और न्यूट्रानों की संख्या बताइए :

   i) हाइड्रोजन, ii) हीलियम iii) ऑक्सीजन iv) गंधक (सल्फर)
9. इस कथन की पुष्टि कीजिए कि परमाणु का द्रव्यमान केन्द्रक में सांद्रित होता है ।
10. परमाणु की संरचना द्रव्य के मौलिक कणों के ज्ञान पर आधारित होती है । उदाहरण देकर समझाइए ।

अध्याय 13

मूलतत्वों का आवर्ती वर्गीकरण

13.1 मूलतत्वों का वर्गीकरण (मैंडलीव की आवर्ती तालिका)

आरंभ में ज्ञात मूलतत्वों की संख्या बहुत कम थी। इस कारण रसायन-शास्त्र का अध्ययन भी सरल था। किन्तु पिछली एक शताब्दी में अधिकाधिक मूलतत्वों की खोज हुई और इस कारण उनके वर्गीकरण की आवश्यकता अनुभव की गई, अन्यथा रसायन का अध्ययन कठिन होता। इस विषय में कुछ आरंभिक प्रयत्न सफल नहीं रहे। सबसे महत्वपूर्ण वर्गीकरण एक रूसी रसायनज्ञ *मैंडलीव* ने किया और इसको *मैंडलीव की आवर्ती प्रणाली* या तालिका का नाम दिया गया। उसने तत्वों को उनके बढ़ते हुए परमाणु भारों के क्रम से तालिका में स्थान दिया, किन्तु इस क्रम से रसायनिक गुणों के आधार पर कुछ परिवर्तन भी किया। उसने देखा कि *समान गुणों की आवर्ती* रूप से पुनरावृत्ति होती है। अतः इस तालिका को आवर्ती वर्गीकरण की संज्ञा दी गई।

काफी समय तक मैंडलीव की आवर्ती तालिका उपयोगी बनी रही, किन्तु आगे चलकर नए-नए अनुसंधान होने से परिवर्तन की आवश्यकता पड़ी।

13.2 आवर्ती तालिका

सन् 1914 में एक ब्रिटिश वैज्ञानिक मोसले ने परमाणु क्रमांकों का एक नया विचार सामने रखा। उसने कहा कि मूलतत्वों के रसायनिक गुणों के निर्धारण में परमाणु भारों की अपेक्षा परमाणु क्रमांक अधिक मौलिक हैं। इसलिए ज्ञात मूलतत्वों को बढ़ते हुए परमाणु भारों की अपेक्षा बढ़ते हुए परमाणु क्रमांकों के अनुसार विन्यास किया गया है। नए खोजे गए मूलतत्व भी इस व्यवस्था में ठीक बैठ गए। इसीसे आधुनिक आवर्ती तालिका बनी जिसका आधार है नया आवर्ती नियम। *नया आवर्ती नियम है : 'जब तत्वों को बढ़ते हुए परमाणु क्रमांकों के अनुसार रखा गया तो यह पाया गया कि उनके गुणों की आवर्ती रूप से पुनरावृत्ति होती है।'* इस चार्ट में मूलतत्व ऐसे वर्गों में रखे गए हैं जिनके गुण समान हैं।

इस तालिका में प्रत्येक तत्व की स्थिति से उसका परमाणु क्रमांक प्रगट होता है। मोसले की एक्स-रे विधि से इस क्रमांक का स्वतंत्र रूप से भी निर्धारण किया जा सकता है। परमाणु क्रमांक धनी आवेशों के बराबर अथवा परमाणु के केंद्रक में प्रोटानों की संख्या के बराबर या केंद्रक के बाहर इलेक्ट्रानों की संख्या के बराबर होता है।

अभी तक के ज्ञात मूलतत्वों का आवर्ती वर्गीकरण पृष्ठ 126-127 पर दिया गया है। इसमें मूल-

तत्वों के सात आवर्त या श्रेणियाँ (क्षैतिज पंक्तियाँ) और नौ समूह (खड़े कालम) होते हैं।

वे तत्व जो प्ररूपी मूलतत्व हैं मुख्य समूहों में से हैं और वे जो कि संक्रमण मूलतत्व कहलाते हैं, उपसमूहों में आते है। समूहों को शून्य से 8 तक की संख्या दी गई है और बहुतों के उपसमूह 'क' और 'ख' भी हैं।

इस तालिका की महत्वपूर्ण विशेषता यह है कि एक समूह के तत्वो की एक ही संयोजकता और एक से गुण होते हैं। इसके कुछ उदाहरण इस प्रकार हैं :

i) *ऐसे अक्रिय मूलतत्व जिनकी सबसे बाहरी कक्षा पूर्ण है और रसायनिक क्रिया नहीं करते।*

ii) *वे वैद्युत धनात्मक तत्व जिनके एक, दो या तीन संयोजकता इलेक्ट्रान होते हैं।* ये धातुएँ होती हैं। धनात्मक आयन बनाने के लिए ये इलेक्ट्रान खोते हैं।

iii) *वे वैद्युत ऋणात्मक तत्व जिनके छः या सात संयोजकता इलेक्ट्रान होते हैं।* ये अधातुएँ होती हैं, जैसे ऑक्सीजन, गंधक (सल्फर) और हैलोजन। ऋणात्मक आयन बनाने के लिए ये इलेक्ट्रान ग्रहण करते है। समूह 'क' में जो मूलतत्व हैं वे कुछ सीमा तक उसी क्रमांक के 'ख' समूह के संगत तत्वों से मिलते-जुलते होते हैं।

13.3 श्रेणियों और समूहों में स्थित मूलतत्वों के गुण

श्रेणियों मे जो मूलतत्व स्थित हैं, उनके गुणों में काफी अंतर होता है। एक श्रेणी में जो मूलतत्व हैं उनका परमाणु क्रमांक जैसे-जैसे बढ़ता जाता है, वैसे-वैसे उनके धात्विक अभिलक्षण घटते जाते है। उदाहरण के लिए सोडियम और मैग्नीशियम धातुएँ हैं जबकि गंधक और क्लोरीन अधातुएँ हैं। प्रत्येक श्रेणी पूरी तरह पूर्ववर्ती श्रेणी से मिलती-जुलती होती है। एक समूह में जो मूलतत्व आते हैं उनके गुण आपस में मिलते-जुलते होते हैं किन्तु वे अन्य समूहों के मूलतत्वो के गुणों से भिन्न होते हैं। उदाहरण के लिए समूह 1 में जो तत्व हैं उनके गुण समूह 7 के तत्वों के गुणों से भिन्न होते है। समूह 1 में जो तत्व हैं उनके धातुओं के प्ररूपी गुण होते है और समूह 7 के तत्वों में अधातुओं के गुण होते हैं। एक ही समूह या परिवार के मूलतत्वों के रसायनिक और भौतिक गुण बहुत कुछ समान होते हैं। किन्तु जैसे-जैसे परमाणु क्रमांक बढ़ता जाता है धीरे-धीरे और नियमित रूप से उनके गुणों मे परिवर्तन होता जाता है। गुणों की यह समानता इस कारण होती है कि एक ही समूह के मूलतत्वों की सबसे बाहरी कक्षा अथवा संयोजकता कक्षा में इलेक्ट्रान की व्यवस्था एक जैसी होती है। इस बारे में इस पुस्तक के अगले भागों में अधिक विस्तार से विचार किया जाएगा।

संक्षेप

मैंडलीव ने बढ़ते हुए परमाणु-भार के क्रम से मूलतत्वों का वर्गीकरण किया।
आधुनिक आवर्ती तालिका परमाणु क्रमांकों के आधार पर बनाई गई है।

आवर्ती नियम यह बताता है कि मूलतत्वों के गुण उनके परमाणु क्रमांकों के आवर्ती कर्म हैं। मूलतत्व बढ़ते हुए परमाणु क्रमाकों के अनुसार व्यवस्थित हैं। वे समूहों और श्रेणियों में रखे गए हैं। खड़े स्तंभों (कालमों) से समूह बनते हैं और क्षैतिज पक्तियों से श्रेणियाँ बनती हैं।

समूह नौ और श्रेणियाँ सात हैं।

एक समूह के तत्वों की संयोजकता एक होती है और न्यूनाधिक रूप में उनके गुण भी एक से होते हैं।

एक श्रेणी के तत्वों की परमाणु संरचना भिन्न-भिन्न होती है और उनके गुण भी काफी भिन्न होते हैं।

दोहराने के लिए प्रश्न

1. मूलतत्वों के वर्गीकरण की तालिका की आवश्यकता क्यों पड़ी ?
2. मेंडलीव की आवर्ती तालिका का आधार क्या था ?
3. यह बताइए कि मेंडलीव प्रणाली में परिवर्धन की आवश्यकता क्यों पड़ी ?
4. आधुनिक आवर्ती नियम क्या है ? पुराने नियम से इसमें क्या भिन्नता है ?
5. वर्गीकरण की प्रणालियों को मूलतत्वों का मेंडलीव आवर्ती वर्गीकरण क्यों कहा गया है ?
6. परमाणु क्रमांक का क्या अर्थ है। उदाहरण देकर अपने उत्तर को स्पष्ट कीजिए।
7. मूलतत्वों का समूह क्या होता है ? मूलतत्वों की श्रेणी किसे कहते हैं ? आवर्ती तालिका में कितने समूह हैं।
8. एक समूह के तत्वों के गुण समान होते हैं किन्तु एक श्रेणी के तत्वों के गुण असमान होते हैं, ऐसा क्यों ?
9. इसका क्या अर्थ है कि एक समूह का जो क्रमांक होता है वही उस समूह के मूलतत्वों की संयोजकता होती है ?
10. संक्षेप में बताइए कि आवर्ती प्रणाली में मूलतत्वों के धात्विक अभिलक्षणों में कैसे परिवर्तन होता है। उन तत्वों के नाम बताइए जो सबसे अधिक और सबसे कम अभिक्रियाशील होते हैं।

आवर्त्ती

आवर्त	वर्ग Iक	वर्ग IIक	वर्ग IIIक	वर्ग IVक	वर्ग Vक	वर्ग VIक	वर्ग VIIक	
1	1 हाइड्रोजन (H) 1.008							
2	3 लिथियम (Li) 6.94	4 बैरिलियम (Be) 9.01						
3	11 सोडियम (Na) 23.00	12 मैग्नीशियम (Mg) 24.3						
4	19 पोटासियम (K) 39.1	20 कैल्सियम (Ca) 40.1	21 स्कैण्डियम (Sc) 45.0	22 टिटानियम (Ti) 47.9	23 वेनेडियम (V) 50.9	24 क्रोमियम (Cr) 52.0	25 मैंगेनीज (Mn) 54.9	26 लोहा (Fe) 55.8
5	37 रूबीडियम (Rb) 85.5	38 स्ट्रान्शियम (Sr) 87.6	39 इट्रियम (Y) 88.9	40 जरकोनियम (Zr) 91.2	41 नायोबियम (Nb) 92.9	42 मोलिब्डियम (Mo) 95.9	43 टैक्नेटियम (Tc) 99.00	44 रूथीनियम (Ru) 101.1
6	55 सैसियम (Cs) 132.9	56 बेरियम (Ba) 137.3	57* लेन्थेनम (La) 138.9	72 हैफनियम (Hf) 178.5	73 टैंटेलम (Ta) 180.9	74 टंग्स्टन (W) 183.9	75 रीनियम (Re) 186.2	76 ऑस्मियम (Os) 190.2
7	87 फ्रेन्सियम (Fr) 223	88 रेडियम (Ra) 226	89** ऐक्टिनियम (Ac) 227					
	*लैन्थेनाइड श्रेणी	58 सीरियम (Ce) 140.1	59 प्रेजिओडिमियम (Pr) 140.9	60 निओडिमियम (Nd) 144.2	61 प्रोमेथियम (Pm) (147)	62 समेरियम (Sm) 150.4	63 यूरोपियम (Eu) 152.0	
	**ऐक्टीनाइड श्रेणी	90 थोरियम (Th) 232.0	91 प्रोटैक्टेनियम (Pa) (231)	92 यूरेनियम (U) 238.0	93 नेपट्यूनियम (Np) (237)	94 प्लूटोनियम (Pu) (242)	95 ऐमेरीशियम (Am) (243)	

टिप्पणी : ब्रैकेट में दिए गए अंक समस्थानिक (Isotope) के परमाणु भार को दर्शाते हैं।

तालिका

वर्ग VIII		वर्ग Iख	वर्ग IIख	वर्ग IIIख	वर्ग IVख	वर्ग Vख	वर्ग VIख	वर्ग VIIख	वर्ग 0
									2 हीलियम **(He)** 4.00
				5 बोरॉन **(B)** 10.8	6 कार्बन **(C)** 12.01	7 नाइट्रोजन **(N)** 14.01	8 आक्सीजन **(O)** 16.00	9 फ्लूरिन **(F)** 19.0	10 निऑन **(Ne)** 20.2
				13 एल्युमिनियम **(Al)** 27.0	14 सिलिकॉन **(Si)** 28.1	15 फॉस्फोरस **(P)** 31.0	16 गन्धक **(S)** 32.1	17 क्लोरीन **(Cl)** 35.5	18 आर्गन **(Ar)** 39.9
27 कोबाल्ट **(Co)** 58.9	28 निकल **(Ni)** 58.9	29 ताँबा **(Cu)** 63.5	30 जस्त **(Zn)** 65.4	31 गैलियम **(Ga)** 69.7	32 जर्मेनियम **(Ge)** 72.6	33 आर्सेनिक **(As)** 74.9	34 सिलीनियम **(Se)** 79.0	35 ब्रोमाइन **(Br)** 79.9	36 क्रिपटन **(Kr)** 83.8
45 रोडियम **(Rh)** 102.9	46 पैलेडियम **(Pd)** 1.064	47 चांदी **(Ag)** 107.9	48 कैडमियम **(Cd)** 112.4	49 इंडियम **(In)** 114.8	50 टीन **(Sn)** 118.7	51 एंटीमोनी **(Sb)** 121.8	52 टेल्यूरियम **(Te)** 127.6	53 आयोडिन **(I)** 126.9	54 जेनान **(Xe)** 131.3
77 इरिडियम **(Ir)** 192.2	78 प्लेटिनम **(Pt)** 195.1	79 सोना **(Au)** 197.0	80 पारा **(Hg)** 200.6	81 थैलियम **(Tl)** 204.4	82 सीसा **(Pb)** 207.2	83 बिस्मथ **(Bi)** 209.0	84 पोलोनियम **(Po)** (209)	85 ऐस्टेटाइन **(At)** (210)	86 रेडॉन **(Rr)** (222)

64 गैडोलीनियम **(Gd)** 157.3	65 टर्बियम **(Tb)** 158.9	66 डिस्प्रोसियम **(Dy)** 162.5	67 होलमियम **(Ho)** 164.9	68 एरबियम **(Er)** 167.3	69 थूलियम **(Tm)** 168.9	70 इर्टबियम **(Yb)** 173.0	71 ल्यूटिशियम **(Lu)** 175.0
96 क्यूरियम **(Cm)** (247)	97 बर्केलियम **(Bk)** (245)	98 केलिफोर्नियम **(Cf)** (251)	99 आइन्सटाइनियम **(Es)** (254)	100 फर्मियम **(Fm)** (253)	101 मेंडेलेवियम **(Md)** (256)	102 नोबेलियम **(No)** (254)	103 लारेंसियम **(Lw)** (257)

परिशेषिका

कुछ महत्वपूर्ण वस्तुनिष्ठ प्रश्न

1. निम्नलिखित कथनों के अलग-अलग कारण बताते हुए समीक्षा कीजिए :

   i) वायु ऑक्सीजन और नाइट्रोजन का यौगिक है।

   ii) कार्बन डाइआक्साइड यौगिक नहीं बल्कि कार्बन और ऑक्सीजन का मिश्रण है।

   iii) ऑक्सीजन जीवन की सहायक है।

   iv) श्वास के साथ भीतर जाने वाली वायु में बाहर निकलने वाली वायु की अपेक्षा अधिक ऑक्सीजन होती है।

   v) श्वास के साथ बाहर निकलने वाली वायु में भीतर जाने वाली वायु की अपेक्षा अधिक कार्बन डाइआक्साइड होती है।

2. कारण देते हुए समझाएँ, ऐसा क्यों होता है:

   i) नदी के पानी में साबुन के घोल में झाग काफी उठते हैं।

   ii) समुद्र के पानी में साबुन के घोल से झाग उठने के बजाए गाढ़ा अवक्षेप बनता है।

   iii) जब पानी का वैद्युत अपघटन होता है तो इससे ऑक्सीजन और हाइड्रोजन निकलती है जो आयतन के अनुसार 1 : 2 के अनुपात में होती है और भार के अनुसार 8 : 1 के अनुपात में।

   iv) पानी एक यौगिक है, और ऑक्सीजन और हाइड्रोजन मूलतत्व।

   v) जब गर्म लोहे की रेतनों पर से भाप गुजारी जाती है तो हाइड्रोजन निकलती है।

3. यह बताइए कि नीचे लिखे कथनों में से कौन-से सही हैं। जो गलत हैं उन्हें ठीक कीजिए। प्रत्येक के बारे में कारण बताइए :

   i) हीरा (डायमंड), ग्रेफाइट और कोयला (चारकोल) एक ही मूलतत्व के भिन्न-भिन्न प्रकार हैं।

ii) जीवन के लिए कार्बन डाइऑक्साइड गैस अनिवार्य है। कार्बन ऊर्जा का स्रोत है।

iii) कार्बन डाइऑक्साइड ज्वलनशील गैस है और कार्बन मोनोऑक्साइड प्रज्वलन में सहायक होती है।

4. नीचे लिखे कथनों को ठीक कीजिए और प्रत्येक के बारे में कारण दीजिए :

i) गंधक (सल्फर) पानी में घुल जाती है।

ii) सल्फर डाइऑक्साइड पानी में घुल जाती है, जिससे क्षारीय घोल बनता है।

iii) जब सल्फर डाइऑक्साइड को बिना बुझे चूने पर से गुजारा जाता है तो यह सूख जाती है।

iv) जब सल्फर (गंधक) को वायु में जलाया जाता है तो हाइड्रोजन सल्फाइड बन जाता है।

5. बताइए कि नीचे लिखे कथनों में कौन-से सही हैं। जो गलत हैं उन्हें ठीक कीजिए। प्रत्येक के बारे में कारण दीजिए :

i) फॉस्फोरस धातु है।

i) फॉस्फोरस प्रकृति के शुद्ध रूप में मिलती है।

iii) लाल फॉस्फोरस सफेद फॉस्फोरस से अधिक विषैली होती है।

iv) जब फॉस्फोरस को वायु में जलाया जाता है तो इससे जो उत्पाद बनता है, वह पानी में घुल जाता है और उससे अम्लीय घोल बनता है।

v) स्फुरदीप्ति (फॉस्फोरेसेंस) फॉस्फोरस के मंद ऑक्सीकरण की प्रक्रिया है।

6. निम्नलिखित कथनों को ठीक कीजिए :

i) सभी धातुएँ ठोस मूलतत्व हैं।

ii) ऐल्युमिनियम धातु प्रकृति में शुद्ध रूप में मिलती है।

iii) सभी धातुएँ अम्लों और क्षारों में घुल जाती हैं।

iv) लोहे के लवण के घोल में से ताँबा लोहे को विस्थापित कर देता है और जस्त चाँदी को विस्थापित कर देता है।

v) सोना हाइड्रोक्लोरिक एसिड और नाइट्रिक एसिड में घुल जाता है।

7. नीचे लिखे कथनों को पूरा कीजिए :

i) अम्ल क्षारक से अभिक्रिया करके—और—बनाता है।

ii) अम्ल—लिटमस को—बना देता है और क्षारक घोल—लिटमस को—कर देता है।

iii) नमक—और—से बनता है।

iv) जब नाइटर को सांद्रित सल्फ्यूरिक एसिड के साथ गर्म किया जाता है तो—और—बनते हैं।

v) जब नमक के घोल को सिल्वर नाइट्रेट में मिलाया जाता है तो इससे—बनता है और

ठोस नमक जब सांद्रित सल्फ्यूरिक एसिड में मिलाया जाता है तो—बनता है।

vi) जब कॉपर सल्फेट के क्रिस्टल गर्म किए जाते हैं तो—और—निकलते हैं। जब संलीन कैल्शियम क्लोराइड नम वायु को प्रभाव्य किया जाता है तो यह—को सोख लेता है और—हो जाता है। ग्लाबर साल्ट जब वायु को प्रभाव्य होता है तो इससे—निकलता है और यह—हो जाता है।

vii) जब जिप्सम को 120° सें० तक गर्म किया जाता है तो—बनता है और यह उत्पाद पानी के साथ मिलकर—होगा।

8. निम्नलिखित कथनों को पूरा कीजिए :

i) नैफ्थलीन—है और—के काम आता है।

ii) कार्बनिक यौगिकों में—अनिवार्य अवयव होता है।

iii) सक्रोज—है और जब इसे सांद्रित सल्फ्यूरिक एसिड के साथ गर्म किया जाता है तो —बनता है।

9. नीचे लिखे कथनों को पूर्ण कीजिए :

i) द्रव्य के सबसे छोटे कण को—कहते है और एक दो या अधिक परमाणुओं के समूह को—कहते हैं।

ii) एक ही मूलतत्व के परमाणु—होते है और भिन्न-भिन्न तत्वों के—होते हैं।

iii) 2·4 ग्राम मैग्नीशियम 1·6 ग्राम ऑक्सीजन से मिलकर—ग्राम मैग्नीशियम ऑक्साइड बनाता है।

iv) रसायनिक सूत्र में मूलतत्वों के—रहते हैं।

v) जल—और—से मिलकर बनता है जो आयतन के अनुसार—अनुपात में और भार के अनुसार—अनुपात में होती हैं।

vi) सल्फ्यूरिक एसिड का अणु सूत्र—है और चूने के पत्थर (लाइम स्टोन) का—है।

10. नीचे लिखे कथनों को पूरा कीजिए :

i) जब चूने के पत्थर को गर्म किया जाता है तो—और—बनते हैं।

ii) जब पोटासियम क्लोरेट को गर्म किया जाता है तो—और—निकलते हैं।

iii) जब रेड लेड को गर्म किया जाता है तो—और—बनते हैं।

iv) जब सिल्वर नाइट्रेट को नमक के साथ मिलाया जाता है तो—और—बनते हैं।

v) जब अमोनियम क्लोराइड को गर्म किया जाता है तो यह—है।

vi) जब संलीन गंधक (सल्फर) और लोहे की रेतनों को मिलाया जाता है तो—बनता है।

11. इन कथनों को ठीक कीजिए :

i) परमाणु भार × संयोजकता = तुल्य भार ।

ii) 12 ग्राम मैग्नीशियम और 16 ग्राम ऑक्सीजन के संयोजन से 28 ग्राम मैग्नीशियम ऑक्साइड बनता है ।

iii) सल्फ्यूरिक एसिड का अणु भार 100 होता है ।

iv) मैग्नीशियम का तुल्य भार $= \frac{\text{मैग्नीशियम का भार}}{\text{संयुक्त ऑक्सीजन का भार}} \times 16$

v) मैग्नीशियम की संयोजकता 3 होती है ।

vi) जब 12 ग्राम मैग्नीशियम की अधिक H_2SO_2 से अभिक्रिया की जाती है तो 2 ग्राम हाइड्रोजन बनती है ।

12. बताइए कि निम्नलिखित में से कौन से वक्तव्य ठीक है और जो गलत है उन्हें ठीक कीजिए :

i) ऑक्सीजन परमाणु का परमाणु क्रमांक 8 है और इसमें 8 न्यूट्रान होते हैं । ऑक्सीजन का परमाणु द्रव्यमान 8 है ।

ii) ऑक्सीजन की संयोजकता 4 है और गंधक की 2 है ।

iii) सोडियम का परमाणु द्रव्यमान 23 है, इसका परमाणु क्रमांक 11 और इसकी संयोजकता 1 है ।

iv) कार्बन का परमाणु क्रमांक 6 और इसकी संयोजकता 4 है ।

v) कैल्सियम का परमाणु क्रमांक 20 है और संयोजकता 2 है ।

13. इन कथनों को ठीक कीजिए :

i) सोडियम की संयोजकता एक है और आवर्ती तालिका में इसका स्थान सातवें समूह में है ।

ii) क्लोरीन की संयोजकता एक है और आवर्ती तालिका के पहले समूह मे इसका स्थान है ।

iii) ऐल्युमिनियम की सयोजकता 3 है और आवर्ती तालिका के तीसरे समूह में इसका स्थान है ।

"One reads in the third chapter of the prophet Daniel that Nebuchadnezzar, the King, caused three men to be placed in a glowing furnace and that the king often went there, looked in, and that he saw with the three, a fourth, who was like the Son of God. The three signify for us, the Holy Trinity and the fourth, the unity of the being. Christ, too, in His explanation denominated the person of the Trinity and the unity of the being."

According to this mystic interpretation, the legend of the three men in the fiery furnace appears as a magic fire ceremony by means of which the Son of God reveals himself. The Trinity is brought together with the unity, or, in other words, through coitus a child is produced. The glowing furnace (like the glowing tripod in "Faust") is a mother symbol, where the children are produced.[45] The fourth in the fiery furnace appears as Christ, the Son of God, who has become a visible God in the fire. The mystic trinity and unity are sexual symbols. (Compare with that the many references in Inman: "Ancient Pagan and Modern Christian Symbolism.") It is said of the Saviour of Israel (the Messiah) and of his enemies, Isaiah x: 17:

"And the light of Israel shall be for a fire, and his Holy One for a flame."

In a hymn of the Syrian Ephrem it is said of Christ: "Thou who art all fire, have mercy upon me."

Agni is the sacrificial flame, the sacrificer, and the sacrificed, as Christ himself. Just as Christ left behind his redeeming blood, φάρμακον ἀθανασίας,* in the stimulating wine, so Agni is the Soma, the holy drink of inspiration, the mead of immortality.[46] Soma and Fire are entirely identical in Hindoo literature, so that in Soma we easily rediscover the libido symbol, through which a series of apparently paradoxical qualities of the Soma are immediately explained. As the old Hindoos recognised in fire an emanation of the inner libido fire, so too they recognised, in the intoxicating drink (Fire-water, Soma-Agni, as rain and fire), an emanation of libido. The Vedic definition of Soma as seminal fluid confirms this interpretation.[47] The Soma significance of fire, similar to the significance of the body of Christ in the Last Supper (compare the Passover lamb of the Jews, baked in the form of a cross), is explained by the psychology of the presexual stage, where the libido was still in part the function of nutrition. The "Soma" is the "nourishing drink," the mythological characterisation of which runs parallel to fire in its origin; therefore, both are united in Agni. The drink of immortality was stirred by the Hindoo gods like fire. Through the retreat of the libido into the presexual stage it becomes clear why so many gods were either defined sexually or were devoured.

As was shown by our discussion of fire preparation, the fire tool did not receive its sexual significance as a later addition, but the

* A portion of immortality.

sexual libido was the motor power which led to its discovery, so that the later teachings of the priests were nothing but confirmations of its actual origin Other primitive discoveries probably have acquired their sexual symbolism in the same manner, being also derived from the sexual libido

In the previous statements, which were based on the Pramantha of the Agni sacrifice, we have concerned ourselves only with one significance of the word manthâmi or mathnâmi, that is to say, with that which expresses the movement of rubbing As Kuhn shows, however, this word also possesses the meaning of tearing off, taking away by violence, robbing [48] As Kuhn points out, this significance is already extant in the Vedic text The legend of its discovery always expresses the production of fire as a robbery (In this far it belongs to the motive widely spread over the earth of the treasure difficult to attain) The fact that in many places and not alone in India the preparation of fire is represented as having its origin in robbery, seems to point to a widely spread thought, according to which the preparation of fire was something forbidden, something usurped or criminal, which could be obtained only through stratagem or deeds of violence (mostly through stratagem) [49] When onanism confronts the physician as a symptom it does so frequently under the symbol of secret pilfering, or crafty imposition, which always signifies the concealed fulfilment of a forbidden wish [50] Historically, this train of thought probably implies that the ritual preparation of fire was employed with a magic purpose, and, therefore, was pursued by official religions, then it became a ritual mystery,[51] guarded by the priests and surrounded with secrecy The ritual laws of the Hindoos threaten with severe punishment him who prepares fire in an incorrect manner The fact alone that something is mysterious means the same as something done in concealment, that which must remain secret, which one may not see nor do; also something which is surrounded by severe punishment of body and soul; therefore, presumably, *something forbidden* which has received a licence as a religious rite After all has been said about the genesis of the preparation of fire, it is no longer difficult to guess what is the forbidden thing, *it is onanism* When I stated before that it might be lack of satisfaction which breaks up the autoerotic ring of the displaced sexual activity transferred to the body itself, and thus opens wider fields of culture, I did not mention that this loosely closed ring of the displaced onanistic activity could be much more firmly closed, when man makes the other great discovery, that of true onanism [52] With that the activity is started in the proper place, and this, under certain circumstances, may mean a satisfaction sufficient for a long time, but at the expense of cheating sexuality of its real purpose It is a fraud upon the natural development of things, because all the dynamic forces which can and should serve the development of culture are withdrawn from it through onanism, since, instead of the displacement, a regression to the

local sexual takes place, which is precisely the opposite of that which is desirable. Psychologically, however, onanism is a discovery of a significance not to be undervalued. One is protected from fate, since no sexual need then has the power to give one up to life. For with onanism one has the greatest magic in one's hands; one needs only to phantasy, and with that to masturbate, then one possesses all the pleasure of the world, and is no longer compelled to conquer the world of one's desires through hard labor and wrestling with reality.[53] Aladdin rubs his lamp and the obedient genii stand at his bidding; thus the fairy tale expresses the great psychologic advantage of the easy regression to the local sexual satisfaction. Aladdin's symbol subtly confirms the ambiguity of the magic fire preparation.

The close relation of the generation of fire to the onanistic act is illustrated by a case, the knowledge of which I owe to Dr. Schmid, in Cery, that of an imbecile peasant youth who set many incendiary fires. At one of these conflagrations he drew suspicion to himself by his behaviour. He stood with his hands in his trouser pockets in the door of an opposite house and gazed with apparent delight at the fire. Under examination in the insane asylum, he described the fire in great detail, and made suspicious movements in his trouser pockets with his hands. The physical examination undertaken at once showed that he had masturbated. Later he confessed that he had masturbated at the time when he had enjoyed the fire which he had enkindled himself.

The preparation of fire in itself is a perfectly ordinary useful custom, employed everywhere for many centuries, which in itself involved nothing more mysterious than eating and drinking. However, there was always a tendency from time to time to prepare fire in a ceremonious and mysterious manner (exactly as with ritual eating and drinking), which was to be carried out in an exactly prescribed way and from which no one dared differ. This mysterious tendency associated with the technique is the second path in the onanistic regression, always present by the side of culture. The strict rules applied to it, the zeal of the ceremonial preparations and the religious awe of the mysteries next originate from this source; the ceremonial, although apparently irrational, is an extremely ingenious institution from the psychologic standpoint, for it represents a substitute for the possibility of onanistic regression accurately circumscribed by law. The law cannot apply to the content of the ceremony, for it is really quite indifferent for the ritual act, whether it is carried out in this way or in that way. On the contrary, it is very essential whether the restrained libido is discharged through a sterile onanism or transposed into the path of sublimation. These severe measures of protection apply primarily to onanism.[54]

I am indebted to Freud for a further important reference to the onanistic nature of the fire theft, or rather the motive of *the treasure difficult of attainment* (to which fire theft belongs). Mythology

contains repeated formulas which read approximately as follows The treasure must be plucked or torn off from a taboo tree (Paradise tree, Hesperides), this is a forbidden and dangerous act The clearest example of this is the old barbaric custom in the service of Diana of Aricia only he can become a priest of the goddess who, in her sacred grove, dares to tear off ("abzureissen") a bough The tearing off has been retained in vulgar speech (besides "abreiben," rubbing) as a symbol of the act of onanism Thus "reiben," to rub, is like "reissen," to break off, both of which are contained in manthami and united apparently only through the myth of the fire theft bound up in the act of onanism in a deeper stratum wherein "reiben," properly speaking, "reissen," is employed, but in a transferred sense Therefore, it might perhaps be anticipated that in the deepest stratum, namely, the incestuous, which precedes the autoerotic stage,[55] the two meanings coincide, which, through lack of mythological tradition, can perhaps be traced through etymology only.

CHAPTER IV

THE UNCONSCIOUS ORIGIN OF THE HERO

PREPARED by the previous chapters, we approach the personification of the libido in the form of a conqueror, a hero or a demon. With this, symbolism leaves the impersonal and neuter realm, which characterises the astral and meteorologic symbol, and takes human form: the figure of a being changing from sorrow to joy, from joy to sorrow, and which, like the sun, sometimes stands in its zenith, sometimes is plunged in darkest night, and arises from this very night to new splendor.[1] Just as the sun, guided by its own internal laws, ascends from morn till noon, and passing beyond the noon descends towards evening, leaving behind its splendor, and then sinks completely into th[illegible] night, thus, too, does mankind follow his course [illegible] laws, and also sinks, after his course is completed, into night, in order to rise again in the morning to a new cycle in his children. The symbolic transition from sun to man is easy and practicable. The third and last creation of Miss Miller's also takes this course. She calls this piece "Chiwantopel," a "hypnagogic poem." She gives the following information about the circumstances surrounding the origin of this phantasy:

"After an evening of care and anxiety, I lay down to sleep at about half past eleven. I felt excited and unable to sleep, although I was very tired. There was no light in the room. I closed my eyes, and then I had the feeling that something was about to happen. The sensation of a general relaxation came over me, and I remained as passive as possible. Lines appeared before my eyes,—sparks and shining spirals, followed by a kaleidoscopic review of recent trivial occurrences."

The reader will regret with me that we cannot know the reason for her cares and anxieties. It would have been of great importance for what follows to have information on this point. This gap in our knowledge is the more to be deplored because, between the first poem in 1898 and the time of the phantasy here discussed (1902), four whole years have passed. All information is lacking regarding this period, during which the great problem surely survived in the unconscious. Perhaps this lack has its advantages in that our interest is not diverted from the universal applicability of the phantasy here produced by sympathy in regard to the personal fate of the author. Therefore, something is obviated which often pre-

vents the analyst in his daily task from looking away from the tedious toil of detail to that wider relation which reveals each neurotic conflict to be involved with human fate as a whole

The condition depicted by the author here corresponds to such a one as usually precedes an intentional somnambulism[2] often described by spiritualistic mediums A certain inclination to listen to these low nocturnal voices must be assumed, otherwise such fine and hardly perceptible inner experiences pass unnoticed We recognise in this listening a current of the libido leading inward and beginning to flow towards a still invisible, mysterious goal It seems that the libido has suddenly discovered an object in the depths of the unconscious which powerfully attracts it The life of man, turned wholly to the external by nature, does not ordinarily permit such introversion, there must, therefore, be surmised a certain exceptional condition, that is to say, a lack of external objects, which compels the individual to seek a substitute for them in his own soul It is, however, difficult to imagine that this rich world has become too poor to offer an object for the love of human atoms, nor can the world and its objects be held accountable for this lack It offers boundless opportunities for every one It is rather the *incapacity to love which robs mankind of his possibilities* This world is empty to him alone who does not understand how to direct his libido towards objects, and to render them alive and beautiful for himself, for Beauty does not indeed lie in things, but in the feeling that we give to them. That which compels us to create a substitute for ourselves is not the external lack of objects, but our incapacity to lovingly include a thing outside of ourselves Certainly the difficulties of the conditions of life and the adversities of the struggle for existence may oppress us, yet even adverse external situations would not hinder the giving out of the libido, on the contrary, they may spur us on to the greatest exertions, whereby we bring our whole libido into reality Real difficulties alone will never be able to force the libido back permanently to such a degree as to give rise, for example, to a neurosis *The conflict, which is the condition of every neurosis, is lacking.* The resistance, which opposes its unwillingness to the will, alone has the power to produce that pathogenic introversion which is the starting point of every psychogenic disturbance The resistance against loving produces the inability to love Just as the normal libido is comparable to a steady stream which pours its waters broadly into the world of reality, so the resistance, dynamically considered, is comparable, not so much to a rock rearing up in the river bed which is flooded over or surrounded by the stream, as to a backward flow towards the source A part of the soul desires the outer object, another part, however, harks back to the subjective world, where the airy and fragile palaces of phantasy beckon One can assume the dualism of the human will for which Bleuler, from the psychiatric point of view, has coined the word "ambitendency"[3] as some-

thing generally present, bearing in mind that even the most primitive motor impulse is in opposition; as, for example, in the act of extension, the flexor muscles also become innervated. This normal ambitendency, however, never leads to an inhibition or prevention of the intended act, but is the indispensable preliminary requirement for its perfection and co-ordination. For a resistance disturbing to this act to arise from this harmony of finely attuned opposition an abnormal plus or minus would be needed on one or the other side. The resistance originates from this added third.[4] This applies also to the duality of the will, from which so many difficulties arise for mankind. The abnormal third frees the pair of opposites, which are normally most intimately united, and causes their manifestation in the form of separate tendencies; it is only thus that they become willingness and unwillingness, which interfere with each other. The Bhagavad Gîta says, "Be thou free of the pairs of opposites." [5] The harmony thus becomes disharmony. It cannot be my task here to investigate whence the unknown third arises, and what it is. Taken at the roots in the case of our patients, the "nuclear complex" (Freud) reveals itself as the *incest problem*. The sexual libido regressing to the parents appears as the incest tendency. The reason this path is so easily travelled is due to the enormous indolence of mankind, which will relinquish no object of the past, but will hold it fast forever. The "sacrilegious backward grasp" of which Nietzsche speaks reveals itself, stripped of its incest covering, as an original passive arrest of the libido in its first object of childhood. This indolence is also a passion, as La Rochefoucauld[6] has brilliantly expressed it:

"Of all passions, that which is least known to ourselves is indolence: it is the most ardent and malignant of them all, although its violence may be insensible, and the injuries it causes may be hidden; if we will consider its power attentively, we will see that it makes itself, upon all occasions, mistress of our sentiments, of our interests, and of our pleasures; it is the anchor, which has the power to arrest the largest vessels; it is a calm more dangerous to the most important affairs than rocks and the worst tempest. The repose of indolence is a secret charm of the soul which suddenly stops the most ardent pursuits and the firmest resolutions; finally to give the true idea of this passion, one must say that indolence is like a beatitude of the soul which consoles it for all its losses and takes the place of all its possessions."

This dangerous passion, belonging above all others to primitive man, appears under the hazardous mask of the incest symbol, from which the incest fear must drive us away, and which must be conquered, in the first place, under the image of the "terrible mother." [7] It is the mother of innumerable evils, not the least of which are neurotic troubles. For, sepecially from the fogs of the arrested remnants of the libido, arise the harmful phantasmagoria which so veil reality that adaptation becomes almost impossible. However, we will not investigate any further in this place the foundations of the incest phantasies. The preliminary suggestion of my purely psychologic conception of the incest problem may suffice. We are here

only concerned with the question whether *resistance* which leads to introversion in our author signifies a conscious external difficulty or not If it were an external difficulty, then, indeed, the libido would be violently dammed back, and would produce a flood of phantasies, which can best be designated as schemes, that is to say, plans as to how the obstacles could be overcome They would be very concrete ideas of reality which seek to pave the way for solutions It would be a strenuous meditation, indeed, which would be more likely to lead to anything rather than to a hypnagogic poem The passive condition depicted above in no way fits in with a real external obstacle, but, precisely through its passive submission, it indicates a tendency which doubtless scorns real solution and prefers phantastic substitutes Ultimately and essentially we are, therefore, dealing with an internal conflict, perhaps after the manner of those earlier conflicts which led to the two first unconscious creations We therefore, are forced to conclude that the external object cannot be loved, because a predominant amount of libido prefers a phantastic object, which must be brought up from the depths of the unconscious as a compensation for the missing reality.

The visionary phenomena, produced in the first stages of introversion, are grouped among the well-known phenomena [8] of hypnagogic vision They form, as I explained in an earlier paper, the foundation of the true visions of the symbolic autorevelations of the libido, as we may now express it

Miss Miller continues

> "Then I had the impression that some communication was immediately impending It seemed to me as if there were re echoed in me the words, 'Speak, O Lord, for Thy servant listens, open Thou mine ears!'"

This passage very clearly describes the intention, the expression "communication" is even a current term in spiritualistic circles The Biblical words contain a clear invocation or "prayer," that is to say, a wish (libido) directed towards divinity (the unconscious complex) The prayer refers to Samuel, 1 3, where Samuel at night was three times called by God, but believed that it was Eli calling, until the latter informed him that it was God himself who spoke, and that he must answer if his name was called again—"Speak, O Lord, for Thy Servant hears!" The dreamer uses these words really in an inverse sense, namely, in order to produce God with them. With that she directs her desires, her libido, into the depths of her unconscious

We know that, although individuals are widely separated by the differences in the contents of their consciousness, they are closely alike in their unconscious psychology. It is a significant impression for one working in practical psychoanalysis when he realizes how uniform are the typical unconscious complexes Difference first arises from individualisation This fact gives to an essential portion of the Schopenhauer and Hartmann philosophies a deep psychologic

justification.[9] The very evident uniformity of the unconscious mechanism serves as a psychologic foundation for these philosophic views. The unconscious contains the differentiated remnants of the earlier psychologic functions overcome by the individual differentiation. The reaction and products of the animal psyche are of a generally diffused uniformity and solidity, which, among men, may be discovered apparently only in traces. Man appears as something extraordinarily individual in contrast with animals.

This might be a tremendous delusion, because we have the appropriate tendency always to recognise only the difference of things. This is demanded by the psychologic adaptation which, without the most minute differentiation of the impressions, would be absolutely impossible. In opposition to this tendency we have ever the greatest difficulty in recognising in their common relations the things with which we are occupied in everyday life. This recognition becomes much easier with things which are more remote from us. For example, it is almost impossible for a European to differentiate the faces in a Chinese throng, although the Chinese have just as individual facial formations as the Europeans, but the similarity of their strange facial expression is much more evident to the remote onlooker than their individual differences. But when we live among the Chinese then the impression of their uniformity disappears more and more, and finally the Chinese become individuals also. Individuality belongs to those conditional actualities which are greatly overrated theoretically on account of their practical significance. It does not belong to those overwhelmingly clear and therefore universally obtrusive general facts upon which a science must primarily be founded. The individual content of consciousness is, therefore, the most unfavorable object imaginable for psychology, because it has veiled the universally valid until it has become unrecognisable. The essence of consciousness is the process of adaptation which takes place in the most minute details. On the other hand, the unconscious is the generally diffused, which not only binds the individuals among themselves to the race, but also unites them backwards with the peoples of the past and their psychology. Thus the unconscious, surpassing the individual in its generality, is, in the first place, the object of a true psychology, which claims not to be psychophysical.

Man as an individual is a suspicious phenomenon, the right of whose existence from a natural biological standpoint could be seriously contested, because, from this point of view, the individual is only a race atom, and has a significance only as a mass constituent. The ethical standpoint, however, gives to the human being an individual tendency separating him from the mass, which, in the course of centuries, led to the development of personality, hand in hand with which developed the hero cult, and has led to the modern individualistic cult of personages. The attempts of rationalistic theology to keep hold of the personal Jesus as the last and most precious

remnant of the divinity which has vanished beyond the power of the imagination corresponds to this tendency In this respect the Roman Catholic Church was more practical, because she met the general need of the visible, or at least historically believed hero, through the fact that she placed upon the throne of worship a small but clearly perceptible god of the world, namely, the Roman Pope, the Pater patrum, and at the same time the Pontifex Maximus of the invisible upper or inner God The sensuous demonstrability of God naturally supports the religious process of introversion, because the human figure essentially facilitates the transference, for it is not easy to imagine something lovable or venerable in a spiritual being This tendency, everywhere present, has been secretly preserved in the rationalistic theology with its Jesus historically insisted upon This does not mean that men loved the visible God, they love him, not as he is, for he is merely a man, and when the pious wished to love humanity they could go to their neighbours and their enemies to love them Mankind wishes to love in God only their ideas, that is to say, the ideas which they project into God By that they wish to love their unconscious, that is, that remnant of ancient humanity and the centuries-old past in all people, namely, the common property left behind from all development which is given to all men, like the sunshine and the air But in loving this inheritance they love that which is common to all Thus they turn back to the mother of humanity, that is to say, to the spirit of the race, and regain in this way something of that connection and of that mysterious and irresistible power which is imparted by the feeling of belonging to the herd It is the problem of Antæus, who preserves his gigantic strength only through contact with mother earth. This temporary withdrawal into one's self, which, as we have already seen, signifies a regression to the childish bond to the parent, seems to act favorably, within certain limits, in its effect upon the psychologic condition of the individual It is in general to be expected that the two fundamental mechanisms of the psychoses, transference and introversion, are to a wide extent extremely appropriate methods of normal reaction against complexes, transference as a means of escaping from the complex into reality, introversion as a means of detaching one's self from reality through the complex

After we have informed ourselves about the general purposes of prayer, we are prepared to hear more about the vision of our dreamer After the prayer, "the head of a sphinx with an Egyptian headdress" appeared, only to vanish quickly Here the author was disturbed, so that for a moment she awoke This vision recalls the previously mentioned phantasy of the Egyptian statue, whose rigid gesture is entirely in place here as a phenomenon of the so-called functional category The light stages of the hypnosis are designated technically as "Engourdissement" (stiffening) The word Sphinx in the whole civilised world signifies the same as riddle,

a puzzling creature who proposes riddles, like the Sphinx of Oedipus, standing at the portal of his fate like a symbolic proclamation of the inevitable. The Sphinx is a semi-theriomorphic representation of that "mother image" which may be designated as the "terrible mother," of whom many traces are found in mythology. This intrepretation is correct for Oedipus. Here the question is opened. The objection will be raised that nothing except the word "Sphinx" justifies the allusion to the Sphinx of Oedipus. On account of the lack of subjective materials, which in the Miller text are wholly lacking in regard to this vision, an individual interpretation would also be excluded. The suggestion of an "Egyptian" phantasy (Part I, Chapter II) is entirely insufficient to be employed here. Therefore we are compelled, if we wish to venture at all upon an understanding of this vision, to direct ourselves—perhaps in all too daring a manner—to the available ethnographic material under the assumption that the unconscious of the present-day man coins its symbols as was done in the most remote past. The Sphinx, in its traditional form, is a half-human, half-animal creature, which we must, in part, interpret in the way that is applicable to such phantastic products. The reader is directed to the deductions in the first part of this volume where the theriomorphic representations of the libido were discussed. This manner of representation is very familiar to the analyst, through the dreams and phantasies of neurotics (and of normal men). The impulse is readily represented as an animal, as a bull, horse, dog, etc. One of my patients, who had questionable relations with women, and who began the treatment with the fear, so to speak, that I would surely forbid him his sexual adventures, dreamed that I (his physician) very skilfully speared to the wall a strange animal, half pig, half crocodile. Dreams swarm with such theriomorphic representations of the libido. Mixed beings, such as are in this dream, are not rare. A series of very beautiful illustrations, where especially the lower half of the animal was represented theriomorphically, has been furnished by Bertschinger.[10] The libido which was represented theriomorphically is the "animal" sexuality which is in a repressed state. The history of repression, as we have seen, goes back to the incest problem, where the first motives for moral resistance against sexuality display themselves. The objects of the repressed libido are, in the last degree, the images of father and mother; therefore the theriomorphic symbols, in so far as they do not symbolise merely the libido in general, have a tendency to present father and mother (for example, father represented by a bull, mother by a cow). From these roots, as we pointed out earlier, might probably arise the theriomorphic attributes of the Divinity. In as far as the repressed libido manifests itself under certian conditions, as anxiety, these animals are generally of a horrible nature. In consciousness we are attached by all sacred bonds to the mother; in the dream she pursues us as a terrible animal. The Sphinx, mythologically

considered, is actually a fear animal, which reveals distinct traits of a mother derivate In the Oedipus legend the Sphinx is sent by Hera, who hates Thebes on account of the birth of Bacchus ; because Oedipus conquers the Sphinx, which is nothing but fear of the mother, he must marry Jocasta, his mother, for the throne and the hand of the widowed queen of Thebes belonged to him who freed the land from the plague of the Sphinx The genealogy of the Sphinx is rich in allusions to the problem touched upon here She is a daughter of Echnida, a mixed being, a beautiful maiden above, a hideous serpent below This double creature corresponds to the picture of the mother, above, the human, lovely and attractive half, below, the horrible animal half, converted into a fear animal through the incest prohibition Echnida is derived from the All-mother, the mother Earth, Gaea, who, with Tartaros, the personified underworld (the place of horrors), brought her forth Echnida herself is the mother of all terrors, of the Chimaera, Scylla, Gorgo, of the horrible Cerberus, of the Nemean Lion, and of the eagle who devoured the liver of Prometheus, besides this she gave birth to a number of dragons One of her sons is Orthrus, the dog of the monstrous Geryon, who was killed by Hercules With this dog, her son, Echnida, in incestuous intercourse, produced the Sphinx. These materials will suffice to characterise that amount of libido which led to the Sphinx symbol If, in spite of the lack of subjective material, we may venture to draw an inference from the Sphinx symbol of our author, we must say that the Sphinx represents an original incestuous amount of libido detached from the bond to the mother Perhaps it is better to postpone this conclusion until we have examined the following visions

After Miss Miller had concentrated herself again, the vision developed further

"Suddenly an Aztec appeared, absolutely clear in every detail, the hands spread open, with large fingers, the head in profile, armoured, headdress similar to the feather ornaments of the American Indian The whole was somewhat suggestive of Mexican sculpture"

The ancient Egyptian character of the Sphinx is replaced here by American antiquity—by the Aztec The essential idea is neither Egypt nor Mexico, for the two could not be interchanged, but it is the subjective factor which the dreamer produces from her own past. I have frequently observed in the analysis of Americans that certain unconscious complexes, *i e.*, repressed sexuality, are represented by the symbol of a Negro or an Indian, for example, when a European tells in his dream, "Then came a ragged, dirty individual," for Americans and for those who live in the tropics it is a Negro When with Europeans it is a vagabond or a criminal, with Americans it is a Negro or an Indian which represents the individual's own repressed sexual personality, and the one considered inferior It is also desirable to go into the particulars of this vision, as there are various things worthy of notice The feather cap,

which naturally had to consist of eagles' feathers, is a sort of magic charm. The hero assumes at the same time something of the sunlike character of this bird when he adorns himself with its feathers, just as the courage and strength of the enemy are appropriated in swallowing his heart or taking his scalp. At the same time, the feather crest is a crown which is equivalent to the rays of the sun. The historical importance of the Sun identification has been seen in the first part.[11]

Especial interest attaches to the hand, which is described as "open," and the fingers, which are described as "large." It is significant that it is the hand upon which the distinct emphasis falls. One might rather have expected a description of the facial expression. It is well known that the gesture of the hand is significant; unfortunately, we know nothing about that here. Nevertheless, a parallel phantasy might be mentioned, which also puts the emphasis upon hands. A patient in a hypnagogic condition saw his mother painted on a wall, like a painting in a Byzantine church. She held one hand up, open wide, with fingers spread apart. The fingers were very large, swollen into knobs on the ends, and each surrounded by a small halo. The immediate association with this picture was the fingers of a frog with sucking discs at the ends. Then the similarity to the penis. The ancient setting of this mother picture is also of importance. Evidently the hand had, in this phantasy, a phallic meaning. This interpretation was confirmed by a further very remarkable phantasy of the same patient. He saw something like a "sky-rocket" ascending from his mother's hand, which at a closer survey becomes a shining bird with golden wings, a golden pheasant, as it then occurs to his mind. We have seen in the previous chapter that the hand has actually a phallic, generative meaning, and that this meaning plays a great part in the production of fire. In connection with this phantasy, there is but one observation to make: fire was bored with the hand; therefore it comes from the hand; Agni, the fire, was worshipped as a golden-winged bird.[12] It is extremely significant that it is the mother's hand. I must deny myself the temptation to enter more deeply into this. Let it be sufficient to have pointed out the possible significance of the hand of the Aztec by means of these parallel hand phantasies. We have mentioned the mother suggestively with the Sphinx. The Aztec taking the place of the Sphinx points, through his suggestive hand, to parallel phantasies in which the phallic hand really belongs to the mother. Likewise we encounter an antique setting in parallel phantasies. The significance of the antique, which experience has shown to be the symbol for "infantile," is confirmed by Miss Miller in this connection in the annotation to her phantasies, for she says:

"In my childhood, I took a special interest in the Aztec fragments and in the history of Peru and of the Incas."

Through the two analyses of children which have been published we have attained an insight into the child's small world, and have seen what burning interests and questions secretly surround the parents, and that the parents are, for a long time, the objects of the greatest interest.[13] We are, therefore, justified in suspecting that the antique setting applies to the "ancients," that is to say, the parents, and that consequently this Aztec has something of the father or mother in himself. Up to this time indirect hints point only to the mother, which is nothing remarkable in an American girl, because Americans, as a result of the extreme detachment from the father, are characterised by a most enormous mother complex, which again is connected with the especial social position of woman in the United States. This position brings about a special masculinity among capable women, which easily makes possible the symbolising into a masculine figure.[14]

After this vision, Miss Miller felt that a name formed itself "bit by bit," which seemed to belong to this Aztec—"the son of an Inca of Peru." The name is "Chi-wan-to-pel." As the author intimated, something similar to this belonged to her childish reminiscences. The act of naming is, like baptism, something exceedingly important for the creation of a personality, because, since olden times, a magic power has been attributed to the name, with which, for example, the spirit of the dead can be conjured. To know the name of any one means, in mythology, to have power over that one. As a well-known example I mention the fairy tale of "Rumpelstilzchen." In an Egyptian myth, Isis robs the Sun god Rê permanently of his power by compelling him to tell her his real name. Therefore, to give a name means to give power, invest with a definite personality.[15] The author observed, in regard to the name itself, that it reminded her very much of the impressive name Popocatepetl, a name which belongs to unforgettable school memories, and, to the greatest indignation of the patient, very often emerges in an analysis in a dream or phantasy and brings with it that same old joke which one heard in school, told oneself and later again forgot. Although one might hesitate to consider this unhallowed joke as of psychologic importance, still one must inquire for the reason of its being. One must also put, as a counter question, Why is it always Popocatepetl and not the neighbouring Iztaccihuatl, or the even higher and just as clear Orizaba? The last has certainly the more beautiful and more easily pronounced name. Popocatepetl is impressive because of its onomatopoetic name. In English the word is "to pop" (popgun), which is here considered as onomatopoesy; in German the words are *Hinterpommern*, *Pumpernickel*; *Bombe*, *Petarde* (*le pet*=flatus). The frequent German word *Popo* (Podex) does not indeed exist in English, but flatus is designated as "to poop" in childish speech. The act of defecation is often designated as "to pop." A joking name for the posterior part is "the bum." (Poop also means the rear end of a ship.) In French, *pouf!* is onomato-

poetic, *pouffer=platzen* (to explode), *la poupe*=rear end of ship, *le poupart* the baby in arms, *la poupée*=doll *Poupon* is a pet name for a chubby-faced child In Dutch *pop*, German *Puppe* and Latin *puppis*=doll; in Plautus, however, it is also used jokingly for the posterior part of the body, *pupus* means child, *pupula*= girl, little dollie. The Greek word ποππύζω designates a cracking, snapping or blowing sound It is used of kissing, by Theocritus also of the associated noise of flute blowing The etymologic parallels show a remarkable relationship between the part of the body in question and the child This relationship we will mention here, only to let it drop at once, as this question will claim our attention later

One of my patients in his childhood had always connected the act of defecation with a phantasy that his posterior was a volcano and a violent eruption took place, explosion of gases and gushings forth of lava The terms for the elemental occurrences of nature are originally not at all poetical, one thinks, for example, of the beautiful phenomenon of the meteor, which the German language most unpoetically calls "Sternschnuppe" (the smouldering wick of a star). Certain South American Indians call the shooting star the "urine of the stars." According to the principle of the least resistance, expressions are taken from the nearest source available. (For example, the transference of the metonymic expression of urination as *Schiffens*, "to rain")

Now it seems to be very obscure why the mystical figure of Chiwantopel, whom Miss Miller, in a note, compares to the control spirit of the spiritualistic medium,[16] is found in such a disreputable neighbourhood that his nature (name) was brought into relation with this particular part of the body In order to understand this possibility, we must realise that when we produce from the unconscious the first to be brought forth is the infantile material long lost in memory. One must, therefore, take the point of view of that time in which this infantile material was still on the surface If now a much-honoured object is related in the unconscious to the anus, then one must conclude that something of a high valuation was expressed thereby The question is only whether this corresponds to the psychology of the child Before we enter upon this question, it must be stated that the anal region is very closely connected with veneration One thinks of the traditional fæces of the Great Mogul. An Oriental tale has the same to say of Christian knights, who anointed themselves with the excrement of the pope and cardinals in order to make themselves formidable A patient who is characterised by a special veneration for her father had a phantasy that she saw her father sitting upon the toilet in a dignified manner, and people going past greeted him effusively.[17] The association of the anal relations by no means excludes high valuation or esteem as is shown by these examples, and as is easily seen from the intimate connection of fæces and gold [18] Here the most worthless comes

into the closest relation with the most valuable. This also happens in religious valuations I discovered (at that time to my great astonishment) that a young patient, very religiously trained, represented in a dream the Crucified on the bottom of a blue-flowered chamber-pot, namely, in the form of excrements The contrast is so enormous that one must assume that the valuations of childhood must indeed be very different from ours This is actually the truth Children bring to the act of defecation and the products of this an esteem and interest [19] which later on is possible only to the hypochondraic We do not comprehend this interest until we learn that the child very early connects with it a theory of propagation [20] The libido afflux probably accounts for the enormous interest in this act The child sees that this is the way in which something is produced, in which something comes out The same child whom I reported in the little brochure " Über Konflicte der kindlichen Seele," and who had a well-developed anal theory of birth, like little Hans, whom Freud made known to us, later contracted a habit of staying a long time on the toilet Once the father grew impatient, went to the toilet and called, " Do come out of there, what are you making? " Whereupon the answer came from within, " A little wagon and two ponies " The child was making a little wagon and two ponies, that is to say, things which at that time she especially wished for In this way one can make what one wishes, and the thing made is the thing wished for The child wishes earnestly for a doll or, at heart, for a real child (That is, the child practised for his future biological task, and in the way in which everything is produced he made the doll [21] himself as representative of the child or of the thing wished for in general [22]) From a patient I have learned a parallel phantasy of her childhood In the toilet there was a crevice in the wall She phantasied that from this crevice a fairy would come out and present her with everything for which she wished The " locus " is known to be the place of dreams where much was wished for and created which later would no longer be suspected of having this place of origin A pathological phantasy in place here is told us by Lombroso,[23] concerning two insane artists Each of them considered himself God and the ruler of the world They created or produced the world by making it come forth from the rectum, just as the egg of birds originates in the egg canal One of these two artists was endowed with a true artistic sense. He painted a picture in which he was just in the act of creation, the world came forth from his anus, the membrum was in full erection, he was naked, surrounded by women, and with all insignia of his power. The excrement is in a certain sense the thing wished for, and on that account it receives the corresponding valuation When I first understood this connection, an observation made long ago, and which disturbed me greatly because I never rightly understood it, became clear to me It concerned an educated patient who, under very tragic circumstances, had to be separated from her

husband and child, and was brought into the insane asylum She exhibited a typical apathy and slovenliness which was considered as affective mental deterioration Even at that time I doubted this deterioration, and was inclined to regard it as a secondary adjustment I took especial pains to ascertain how I could discover the existence of the affect in this case Finally, after more than three hours' hard work I succeeded in finding a train of thought which suddenly brought the patient into a completely adequate and therefore strongly emotional state At this moment the affective connection with her was completely re-established That happened in the forenoon When I returned at the appointed time in the evening to the ward to see her she had, for my reception, smeared herself from head to foot with excrement, and cried laughingly, "Do I please you so?" She had never done that before, it was plainly destined for me The impression which I received was one of a personal affront and, as a result of this, I was convinced for years after of the affective deterioration of such cases Now we understand this act as an infantile ceremony of welcome or a declaration of love

The origin of Chiwantopel, that is to say, an unconscious personality, therefore means, in the sense of the previous explanation, "I make, produce, invent him myself" It is a sort of human creation or birth by the anal route The first people were made from excrement, potter's earth, or clay The Latin *lutum* which really means "moistened earth," also has the transferred meaning of dirt. In Plautus it is even a term of abuse, something like "You scum" The birth from the anus also reminds us of the motive of "throwing behind oneself" A well-known example is the oracular command, which Deucalion and Pyrrha, who were the only survivors from the great flood, received They were to throw behind them the bones of the great mother They then threw behind them stones, from which mankind sprang According to a tradition, the Dactyli in a similar manner sprang from dust, which the nymph Anchiale threw behind her. There is also humorous significance attached to the anal products The excrements are often considered in popular humor as a monument or memorial (which plays a special part in regard to the criminal in the form of *grumus merdæ*), every one knows the humorous story of the man who, led by the spirit through labyrinthian passages to a hidden treasure, after he had shed all his pieces of clothing, deposited excrement as a last guide post on his road In a more distant past a sign of this kind possessed as great a significance as the dung of animals to indicate the direction taken Simple monuments ("little stone figures") have taken the place of this perishable mark

It is noteworthy that Miss Miller quotes another case, where a name suddenly obtruded itself, parallel to the emerging into consciousness of Chiwantopel, namely, A-ha-ma-ra-ma with a feeling that it dealt with something Assyrian [24] As a possible source

of this, there occurred to her "Asurabama, who made cuneiform bricks,"[25] those imperishable documents made from clay: the monuments of the most ancient history. If it were not emphasised that the bricks are "cuneiform," then it might mean ambiguously "wedged-shaped bricks," which is more suggestive of our interpretation than that of the author.

Miss Miller remarks that besides the name "Asurabama" she also thought of "Ahasuerus" or "Ahasverus." This phantasy leads to a very different aspect of the problem of the unconscious personality. While the previous materials betrayed to us something of the infantile theory of creation, this phantasy opens up a vista into the dynamics of the unconscious creation of personality. Ahasver is, as is well known, the Wandering Jew; he is characterised by endless and restless wanderings until the end of the world. The fact that the author has thought of this particular name justifies us in following this trail. The legend of Ahasver, the first literary traces of which belong to the thirteenth century, seems to be of Occidental origin, and belongs to those ideas which possess indestructible vital energy. The figure of the Wandering Jew has undergone more literary elaboration than the figure of Faust, and nearly all of this work belongs to the last century. If the figure is not called Ahasver, still it is there under another name, perhaps as Count of St. Germain, the mysterious Rosicrucian, whose immortality was assured, and whose temporary residence (the land) was equally known.[26] Although the stories about Ahasver cannot be traced back any earlier than the thirteenth century, the oral tradition can reach back considerably further, and it is not an impossibility that a bridge to the Orient exists. There is the parallel figure of Chidr, or "al Chadir," the "ever-youthful Chidher" celebrated in song by Rueckert. The legend is purely Islamitic. The peculiar feature, however, is that Chidher is not only a saint, but in Sufic circles[27] rises even to divine significance. In view of the severe monotheism of Islam, one is inclined to think of Chidher as a pre-Islamitic Arabian divinity who would hardly be officially recognised by the new religion, but might have been tolerated on political grounds. But there is nothing to prove that. The first traces of Chidher are found in the commentaries of the Koran, Buchâri and Tabare and in a commentary to a noteworthy passage of the eighteenth sura of the Koran. The eighteenth sura is entitled "the cave," that is, after the cave of the seven sleepers, who, according to the legend, slept there for 309 years, and thus escaped persecution, and awoke in a new era. Their legend is recounted in the eighteenth sura, and divers reflections were associated with it. The wish-fulfilment idea of the legend is very clear. The mystic material for it is the immutable model of the Sun's course. The Sun sets periodically, but does not die. It hides in the womb of the sea or in a subterranean cave,[28] and in the morning is "born

again," complete. The language in which this astronomic occurrence is clothed is one of clear symbolism, the Sun returns into the mother's womb, and after some time is again born. Of course, this event is properly an incestuous act, of which, in mythology, clear traces are still retained, not the least of which is the circumstance that the dying and resurrected gods are the lovers of their own mothers or have generated themselves through their own mothers. Christ as the "God becoming flesh" has generated himself through Mary; Mithra has done the same. These Gods are unmistakable Sun-gods, for the Sun also does this, in order to again renew himself. Naturally, it is not to be assumed that astronomy came first and these conceptions of gods afterwards, the process was, as always, inverted, and it is even true that primitive magic charms of rebirth, baptism, superstitious usages of all sorts, concerning the cure of the sick, etc, were projected into the heavens. These youths were born from the cave (the womb of mother earth), like the Sun-gods, in a new era, and this was the way they vanquished death. In this far they were immortal. It is now interesting to see how the Koran comes, after long ethical contemplations in the course of the same sura, to the following passage, which is of especial significance for the origin of the Chidher myth. For this reason I quote the Koran literally:

"Remember when Moses said to his servant, 'I will not stop till I reach the confluence of the two seas, or for eighty years will I journey on.'

"But when they reached their confluence they forgot their fish, and it took its way in the sea at will.

"And when they had passed on, Moses said to his servant, 'Bring us our morning meal, for now we have incurred weariness from this our journey.'

"He said, 'What thinkest thou? When we repaired to the rock for rest, then verily I forgot the fish; and none but Satan made me forget it, so as not to mention it, and it hath taken its way in the sea in a wondrous sort.'

"He said, 'It is this we were in quest of.' So they both went back retracing their footsteps.

"Then found they one of our servents to whom we had vouchsafed our mercy, and whom we had instructed with our knowledge, [9]

"Moses said to him, 'Shall I follow thee that thou teach me, for guidance of that which thou hast been taught?'

"He said, 'Verily, thou canst by no means have patience with me, and how canst thou be patient in matters whose meaning thou comprehendest not?'"—Trans. Rodwell, page 188.

Moses now accompanies the mysterious servant of God, who does divers things which Moses cannot comprehend, finally the Unknown takes leave of Moses, and speaks to him as follows:

"They will ask thee of Dhoulkarnein (the two horned) [10] Say: 'I will recite to you an account of him.'

"Verily, we established his power upon the earth and we gave him a means to accomplish every end, so he followed his way,

"Until when he reached the setting of the sun, he found it to set in a miry forest; and hard by, he found a people. . ."

Now follows a moral reflection, then the narrative continues:

"Then he followed his course further until he came to the place where the sun rises."

If now we wish to know who is the unknown servant of God, we are told in this passage *he is Dhulqarnein, Alexander, the Sun*, *he goes to the place of setting and he goes to the place of rising*. The passage about the unknown servant of God is explained by the commentaries in a well-defined legend. The servant is Chidher "the verdant one," the never-tiring wanderer, who roams for hundreds and thousands of years over lands and seas, the teacher and counsellor of pious men, the one wise in divine knowledge—the immortal.[31] The authority of the Tabari associates Chidher with Dhulqarnein; Chidher is said to have reached the "stream of life" as a follower of Alexander, and both unwittingly had drunk of it, so that they became immortal. Moreover, *Chidher is identified by the old commentators with Elias*, who also did not die, but *who was taken to Heaven in a fiery chariot*. Elias is *Helios*.[32] It is to be observed that Ahasver also owes his existence to an obscure place in the holy Christian scriptures. This place is to be found in Matthew xvi: 28. First comes the scene where Christ appoints Peter as the rock of his church, and nominates him the governor of his power.[33] After that follows the prophecy of his death, and then comes the passage:

"Verily, I say unto you, there be some standing here, which shall not taste of death till they see the Son of Man coming in his kingdom."

Here follows the scene of the transfiguration:

"And was transfigured before them: and his face did shine as the sun, and his raiment was white as the light.

"And behold there appeared unto them Moses and Elias talking with him.

"Then answered Peter and said unto Jesus, 'Lord, it is good for us to be here; if thou wilt, let us make here three tabernacles; one for thee and one for Moses and one for Elias.'"[34]

From these passages it appears that Christ stands on the same plane as Elias, without being identified with him,[35] although the people consider him as Elias. The ascension places Christ as identical with Elias. The prophecy of Christ shows that there exist aside from himself one or more immortals who shall not die until Parousai. According to John xxi: 22nd verse, the boy John was considered as one of these immortals, and in the legend he is, in fact, not dead, but merely sleeping in the ground until Parousai, and breathes so that the dust swirls round his grave.[36] As is evident, there are passable bridges from Christ by way of Elias to Chidher and Ahasuerus. It is said in an account of this legend[37] that Dhulqarnein led his friend Chidher to the "source of life" in order to have him drink of immortality.[38] Alexander also bathed in the stream of life and performed the ritual ablutions. As I previously mentioned in a footnote, according to Matthew xvii: 12th verse, John the Baptist is Elias, therefore primarily identical with Chidher

Now, however, it is to be noted that in the Arabian legend Chidher appears rather as a companion or accompanied (Chidher with Dhulqarnein or with Elias, "like unto them", or identified with them[39]) There are therefore, two similar figures who resemble each other, but who, nevertheless, are distinct The analogous situation in the Christian legend is found in the scene by the Jordan where John leads Christ to the "source of life" Christ is there, the subordinate, John the superior, similar to Dhulqarnein and Chidher, or Chidher and Moses, also Elias The latter relation especially is such that Vollers compares Chidher and Elias, on the one side, with Gilgamesh and his mortal brother Eabani, on the other side, with the Dioscuri, one of whom is immortal, the other mortal This relation is also found in Christ and John the Baptist,[40] on the one hand, and Christ and Peter, on the other The last-named parallel only finds its explanation through comparison with the Mithraic mysteries, where the esoteric contents are revealed to us through monuments Upon the Mithraic marble relief of Klagenfurt[41] it is represented how with a halo Mithra crowns Helios, who either kneels before him or else floats up to him from below Mithra is represented on a Mithraic monument of Osterburken as holding in his right hand the shoulder of the mystic ox above Helios, who stand bowed down before him, the left hand resting on a sword hilt A crown lies between them on the ground Cumont observes about this scene that it probably represents the divine prototype of the ceremony of the initiation into the degree of Miles, in which a sword and a crown were conferred upon the mystic Helios is, therefore appointed the Miles of Mithra In a general way, Mithra seems to occupy the *role* of patron to Helios, which reminds us of the boldness of Hercules towards Helios Upon his journey towards Geryon, Helios burns too hotly, Hercules, full of anger, threatens him with his never-failing arrows Therefore, Helios is compelled to yield, and lends to the hero his Sun ship, with which he was accustomed to journey across the sea Thus Hercules returns to Erythia, to the cattle herds of Geryon[42] On the monument at Klagenfurt, Mithra is furthermore represented pressing Helios's hand, either in farewell or as a ratification In a further scene Mithra mounts the Chariot of Helios, either for the ascension or the "Sea Journey"[43] Cumont is of the opinion that Mithra gives to Helios a sort of ceremonious investiture and consecrates him with his divine power by crowning him with his own hands This relation corresponds to that of Christ to Peter Peter, through his symbol, the cock, has the character of a sun-god After the ascension (or sea journey) of Christ, he is the visible pontiff of the divinity, he suffers, therefore, the same death (crucifixion) as Christ, and becomes the great Roman deity (*Sol invictus*), the conquering, triumphant Church itself, embodied in the Pope In the scene of Malchus he is always shown as the miles of Christ, to whom the sword is granted, and as the rock upon which the Church is founded The crown[44] is also given to him who pos

sesses the power to bind and to set free Thus, Christ, like the Sun, is the visible God, whereas the Pope, like the heir of the Roman Cæsars, is *solis invicti comes* The setting sun appoints a successor whom he invests with the power of the sun [45] Dhulqarnein gives Chidher eternal life Chidher communicates his wisdom to Moses [46] There even exists a report according to which the forgetful servant of Joshua drinks from the well of life, whereupon he becomes immortal, and is placed in a ship by Chidher and Moses, as a punishment, and is cast out to sea, once more a fragment of a sun myth, the motive of the " sea journey " [47]

The primitive symbol, which designates that portion of the Zodiac in which the Sun, with the Winter Solstice, again enters upon the yearly course, is the goat, fish sign, the αἰγωκέρως The Sun mounts like a goat to the highest mountain, and later goes into the water as a fish The fish is the symbol of the child,[48] for the child before his birth lives in the water like a fish, and the Sun, because it plunges into the sea, becomes equally child and fish The fish, however, is also a phallic symbol,[49] also a symbol for the woman [50] Briefly stated, the fish is a libido symbol, and, indeed, as it seems predominately *for the renewal of the libido.*

The journey of Moses with his servant is a life-journey (eighty years) They grow old and lose their life force (libido), that is, they lose the fish which " pursues its course in a marvellous manner to the sea," which means the setting of the sun When the two notice their loss, they discover at the place where the " source of life " is found (where the dead fish revived and sprang into the sea) Chidher wrapped in his mantle,[51] sitting on the ground According to another version, he sat on an island in the sea, or " in the wettest place on earth," that is, he was just *born from the maternal depths* Where the fish vanished Chidher, " the verdant one," was born as a " son of the deep waters," his head veiled, a Cabir, a proclaimer of divine wisdom , the old Babylonian Oannes-Ea, who was represented in the form of a fish, and daily came from the sea as a fish to teach the people wisdom [52] His name was brought into connection with John's With the rising of the renewed sun all that lived in darkness, as water-animal or fish, surrounded by all terrors of night and death,[53] became as the shining fiery firmament of the day Thus the words of John the Baptist [54] gain especial meaning .

> " I indeed baptize you with water unto repentance, but he that cometh after me is mightier than I, whose shoes I am not worthy to bear , he shall baptize you with the Holy Ghost and with fire "

With Vollers we may also compare Chidher and Elias (Moses and his servant Joshua) with Gilgamesh and his brother Eabani Gilgamesh wandered through the world, driven by anxiety and longing, to find immortality His path led him across the seas to the wise Utnapishtim (Noah), who knew how to cross the waters of death.

There Gilgamesh had to dive down to the bottom of the sea for the magical herb which was to lead him back to the land of men. When he had come again to his native land a serpent stole the magic plant from him (the fish again slid into the sea) But on the return from the land of the blessed an immortal mariner accompanied him, who, banished by a curse of Utnapishtim, was forbidden to return to the land of the blessed Gilgamesh's journey had lost its purpose on account of the loss of the magic herb, instead he is accompanied by an immortal, whose fate, indeed, we cannot learn from the fragments of the epic This banished immortal is the model for Ahasver, as Jensen [55] aptly remarked

Again we encounter the motive of the Dioscuri, mortal and immortal, setting and rising sun. This *motive is also represented as if projected from the hero*

The Sacrificium Mithriacum (the sacrifice of the bull) is in its religious representation very often flanked by the two Dadophores, Cautes and Cautopates, one with a raised and the other with a lowered torch They represent brothers who reveal their character through the symbolic position of the torch Cumont connects them, not without meaning, with the sepulchral "erotes" who as genii with the reversed torches have traditional meaning The one is supposed to stand for death and the other for life. I cannot refrain from mentioning the similarity between the Sacrificium Mithriacum (where the sacrificed bull in the centre is flanked on both sides by Dadophores) to the Christian sacrifice of the lamb (ram) The Crucified is also traditionally flanked by the two thieves, one of whom ascends to Paradise, while the other descends to Hell [56] The idea of the mortal and the immortal seems to have passed also into the Christian worship Semitic gods are often represented as flanked by two Paredroi, for example, Baal of Edessa, accompanied by Aziz and Monimoz (Baal as the Sun), accompanied by Mars and Mercury, as expressed in astronomical teachings) According to the Chaldean view, the gods are grouped into triads. In this circle of ideas belongs also the Trinity, the idea of the triune God, in which Christ must be considered in his unity with the Father and the Holy Ghost. So, too, do the two thieves belong inwardly to Christ. The two Dadophores are, as Cumont points out, nothing but offshoots [57] from the chief figure of Mithra, to whom belongs a mysterious threefold character According to an account of Dionysus Areopagita, the magicians celebrated a festival, "τοῦ τριπλασίου Μίθρου" * [58] An observation likewise referring to the Trinity is made by Plutarch concerning Ormuzd τρὶς ἑαυτὸν αὐξήσας ἀπέστησε τοῦ ἡλίου † The Trinity, as three different states of the unity, is also a Christian thought. In the very first place this suggests a sun myth An observation by Macrobius I 18 seems to lend support to this idea

* Of the threefold Mithra

† Having expanded himself threefold, he departed from the sun

" Hæ autem ætatum diversitates ad solem referuntur, ut parvulus videatur hiemali solstitio, qualem Aegyptii proferunt ex adyto die certa, æquinoctio vernali figura iuvenis ornatur. Postea statuitur ætas ejus plenissima effigie barbæ solstitio æstivo ... exunde per diminutiones veluti senescenti quarta forma deus figuratur." * [59]

As Cumont observes, Cautes and Cautapates occasionally carry in their hands the head of a bull, and a scorpion.[60] Taurus and Scorpio are equinoctial signs, which clearly indicate that the sacrificial scene refers primarily to the Sun cycle; the rising Sun, which sacrifices itself at the summer solstice, and the setting Sun. In the sacrificial scene the symbol of the rising and setting Sun was not easily represented; therefore, this idea was removed from the sacrificial image.

We have pointed out above that the Dioscuri represent a similar idea, although in a somewhat different form; the one sun is always mortal, the other immortal. As this entire sun mythology is merely a psychologic projection to the heavens, the fundamental thesis probably is as follows; just as man consists of a mortal and immortal part, so the sun is a pair of brothers,[61] one being mortal, the other immortal. This thought lies at the basis of all theology in general. Man is, indeed, mortal, but there are some who are immortal, or there is something in us which is immortal. Thus the gods, " a Chidher or a St. Germain," are our immortal part, which, though incomprehensible, dwells among us somewhere.

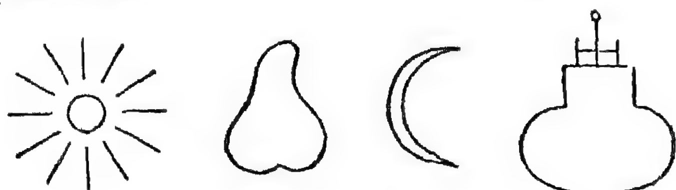
Comparison with the sun teaches us over and over again that the gods are libido. It is that part of us which is immortal, since it represents that bond through which we feel that in the race we are never extinguished.[62] It is life from the life of mankind. Its springs, which well up from the depths of the unconscious, come, as does our life in general, from the root of the whole of humanity, since we are indeed only a twig broken off from the mother and transplanted.

Since the divine in us is the libido,[63] we must not wonder that we have taken along with us in our theology ancient representations from olden times, which give the triune figure to the God. We have taken this τριπλάσιον θεόν † from the phallic symbolism, the originality of which may well be uncontested.[64] The male genitals are the basis for this Trinity. It is an anatomical fact that one testicle is generally placed somewhat higher than the other, and it is also a very old, but, nevertheless, still surviving, superstition that one testicle generates a boy and the other a girl.[65] A late Babylonian bas-relief from Lajard's [66] collection seems to be in accordance with

* Now these differences in the seasons refer to the Sun, which seems at the winter solstice an infant, such as the Egyptians on a certain day bring out of their sanctuaries; at the vernal equinox it is represented as a youth. Later, at the summer solstice, its age is represented by a full growth of beard, while at the last, the god is represented by the gradually diminishing form of an old man.

† Threefold God.

this view. In the middle of the image stands an androgynous god (masculine and feminine face [67]), upon the right, male side, is found a serpent, with a sun halo round its head, upon the left, female side, there is also a serpent, with the moon above its head Above the head of the god there are three stars This ensemble would seem to confirm the Trinity [68] of the representation The Sun serpent at the right side is male, the serpent at the left is female (signified by the moon) This image possesses a symbolic sexual suffix, which makes the sexual significance of the whole obtrusive Upon the male side a rhomb is found—a favorite symbol of the female genitals, upon the female side there is a wheel or felly A wheel always refers to the Sun, but the spokes are thickened and enlarged at the ends, which suggests phallic symbolism It seems to be a phallic wheel, which was not unknown in antiquity. There are obscene bas-reliefs where Cupid turns a wheel of nothing but phalli [69]. It is not only the serpent which suggests the phallic significance of the Sun, I quote one especially marked case, from an abundance of proof In the antique collection at Verona I discovered a late Roman mystic inscription in which are the following representations:



These symbols are easily read: Sun—Phallus, Moon—Vagina (Uterus) This interpretation is confirmed by another figure of the same collection There the same representation is found, only the vessel [70] is replaced by the figure of a woman. The impressions on coins, where in the middle a palm is seen encoiled by a snake, flanked by two stones (testicles), or else in the middle a stone encircled by a snake, to the right a palm, to the left a shell (female genitals [71]), should be interpreted in a similar manner. In Lajard's "Researches" ("The Cult of Venus") there is a coin of Perga, where Artemis of Perga is represented by a conical stone (phallic) flanked by a man (claimed to be Men) and by a female figure (claimed to be Artemis) Men (the so-called Lunus) is found upon an Attic bas-relief apparently with the spear but fundamentally a sceptre with a phallic significance, flanked by Pan with a club (phallus) and a female figure [72] The traditional representation of the Crucified flanked by John and Mary is closely associated with this circle of ideas, precisely as is the Crucified with the thieves From this we see how, beside the Sun, there emerges again and again the much more primitive comparison of the libido with the phallus An especial trace still deserves mention here. The Dadophor Cauta-

pates, who represents Mithra, is also represented with the cock[73] and the pineapple But these are the attributes of the Phrygian god Men, whose cult was widely diffused Men was represented with Pileus,[74] the pineapple and the cock, also in the form of a boy, just as the Dadophores are boyish figures (This last-named property relates them with Men to the Cabiri) Men has a very close connection with Attis, the son and lover of Cybele In the time of the Roman Cæsars, Men and Attis were entirely identified, as stated above Attis also wears the Pileus like Men, Mithra and the Dadophores As the son and lover of his mother he again leads us to the source of this religion-creating incest libido, namely, to the mother Incest leads logically to ceremonial castration in the Attic-Cybele cult, for the Hero, driven insane by his mother, mutilates himself[75] I must at present forego entering more deeply into this matter, because the incest problem is to be discussed at the close Let this suggestion suffice—that from different directions the analysis of the libido symbolism always leads back again to the mother incest Therefore, we may surmise that the longing of the libido raised to God (repressed into the unconscious) is a primitive, incestuous one which concerns the mother Through renouncing the virility to the first beloved, the mother, the feminine element becomes extremely predominant, hence the strongly androgynous character of the dying and resurrected Redeemer That these heroes are nearly always wanderers[76] is a psychologically clear symbolism The wandering is a representation of longing,[77] of the ever-restless desire, which nowhere finds its object, for, unknown to itself, it seeks the lost mother The wandering association renders the Sun comparison easily intelligible, also, under this aspect, the heroes always resemble the wandering Sun, which seems to justify the fact that the myth of the hero is a sun myth But the myth of the hero, however, is, as it appears to me, the myth of our own suffering unconscious, which has an unquenchable longing for all the deepest sources of our own being, for the body of the mother, and through it for communion with infinite life in the countless forms of existence. Here I must introduce the words of the Master who has divined the deepest roots of Faustian longings

"Unwilling, I reveal a loftier mystery —
In solitude are throned the Goddesses,
No Space around them, Place and Time still less
Only to speak of them embarrasses
They are THE MOTHERS

"Goddesses unknown to ye,
The Mortals,—named by us unwillingly
Delve in the deepest depths must thou to reach them.
'Tis thine own fault that we for help beseech them

"Where is the way?

"No way! To the Unreachable,
Ne'er to be trodden! A way to the Unbeseechable,
Never to be besought! Art thou prepared?
There are no locks, no latches to be lifted!
Through endless solitudes shalt thou be drifted!
Hast thou through solitudes and deserts fared?
And hadst thou swum to farthest verge of ocean
And there the boundless space beheld,
Still hadst thou seen wave after wave in motion,
Even though impending doom thy fear compelled
Thou hadst seen something—in the beryl dim
Of peace-lulled seas, the sportive dolphins swim;

Hadst seen the flying clouds, sun, moon and star,
Nought shalt thou see in endless Void afar—
Not hear thy footstep fall, nor meet
A stable spot to rest thy feet

"Here, take this key!
The Key will scent the true place from all others;
Follow it down! 'Twill lead thee to the Mothers;

"Descend then! I could also say Ascend!
'Twere all the same. *Escape from the Created*
To shapeless forms in liberated spaces!
Enjoy what long ere this was dissipated!
There whirls the press, like clouds on clouds unfolding;
Then with stretched arm swing high the key thou'rt holding!

"At last a blazing tripod,[18] tells thee this,
That there the utterly deepest bottom is
Its light to thee will then the Mothers show,
Some in their seats, the others stand or go,
At their own will. Formation, Transformation
The Eternal Mind's eternal recreation,
Forms of all Creatures,—there are floating free
They'll see thee not! for only wraiths they see
So pluck up heart,—the danger then is great
Go to the tripod ere thou hesitate,
And touch it with the key."

CHAPTER V

SYMBOLISM OF THE MOTHER AND OF REBIRTH

THE vision following the creation of the hero is described by Miss Miller as a "throng of people." This representation is known to us from dream interpretation as being, above all, the symbol of mystery.[1] Freud thinks that this choice of symbol is determined on account of its possibility of representing the idea. The bearer of the mystery is placed in opposition to the multitude of the ignorant. *The possession of the mystery cuts one off from intercourse with the rest of mankind.* For a very complete and smooth rapport with the surroundings is of great importance for the management of the libido and the *possession of a subjectively important secret generally creates a great disturbance.* It may be said that the whole art of life shrinks to the one problem of how the libido may be freed in the most harmless way possible. Therefore, the neurotic derives special benefit in treatment when he can at last rid himself of his various secrets. The symbol of the crowd of people, chiefly the streaming and moving mass, is, as I have often seen, substituted for the great excitement in the unconscious, especially in persons who are outwardly calm.

The vision of the "throng" develops further; horses emerge; a battle is fought. With Silberer, I might accept the significance of this vision as belonging, first of all, in the "functional category," because, fundamentally, the conception of the intermingling crowds is nothing but the symbol of the present onrush of the mass of thought; likewise the battle, and possibly the horses, which illustrate the movement. The deeper significance of the appearance of the horses will be seen for the first time in the further course of our treatment of the mother symbolism. The following vision has a more definite and significantly important character. Miss Miller sees a City of Dreams ("Cité de Rêves"). The picture is similar to one she saw a short time before on the cover of a magazine. Unfortunately, we learn nothing further about it. One can easily imagine under this "Cité de Reves" a fulfilled wish dream, that is to say, something very beautiful and grealy longed for; a sort of heavenly Jerusalem, as the poet of the Apocalypse has dreamed it. The city is a maternal symbol, a woman who fosters the inhabitants as children. It is, therefore, intelligible that the two mother goddesses, Rhea and Cybele, both wear the wall crown. The Old Testament treats the cities of Jerusalem, Babel, etc., as women (Isaiah xlvii. 1-5):

"Come down and sit in the dust, O virgin daughter of Babylon, sit on the ground: there is no throne, O daughter of the Chaldeans; for thou shalt no more be called tender and delicate. Take the millstones and grind meal, uncover thy locks, make bare the leg, uncover the thigh, pass over the rivers. That thy nakedness shall be uncovered, yea, thy shame shall be seen; sit thou silent, and get thee into darkness, O daughter of the Chaldeans; for thou shalt no more be called the lady of the kingdoms."

Jeremiah says of Babel (l. 12):

"Your mother shall be sore confounded; she that bare you shall be ashamed."

Strong, unconquered cities are virgins; colonies are sons and daughters. Cities are also whores. Isaiah says of Tyre (xxiii. 16):

"Take an harp, go about the city, thou harlot; thou has been forgotten."

And

"How does it come to pass that the virtuous city has become an harlot?"

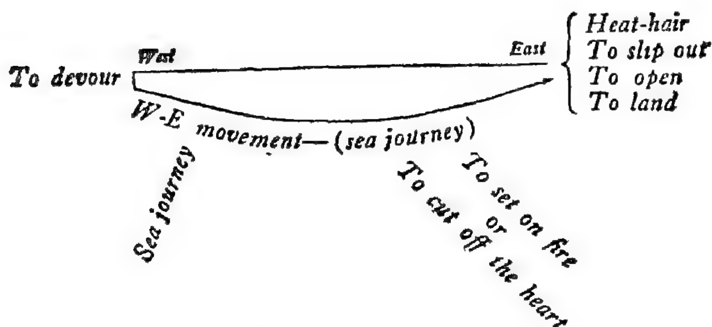
We come across a similar symbolism in the myth of Ogyges, the mythical king who rules in Egyptian Thebes and whose wife was appropriately named Thebe. The Bœtian Thebes founded by Cadmus received on that account a surname, "Ogygian." This surname was also given to the great flood, as it was called "Ogygian" because it occurred under Ogyges. This coincidence will be found later on to be hardly accidental. The fact that the city and the wife of Ogyges bear the same name indicates that somewhere a relation must exist between the city and the woman, which is not difficult to understand, for the city is identical with the woman. We meet a similar idea in Hindoo lore where Indra appears as the husband of Urvara, but Urvara means "the fertile land." In a similar way the occupancy of a country by the king was understood as marriage with the ploughed land. Similar representations must have prevailed in Europe as well. Princes had to guarantee, for example, a good harvest at their accession. The Swedish King Domaldi was actually killed on account of the failure of the harvest (Ynglinga sâga 18). In the Rama sâga the hero Rama marries Sîtâ, the furrow of the field.[2] To the same group of ideas belongs the Chinese custom of the Emperor ploughing a furrow at his ascension to the throne. This idea of the soil being feminine also embraces the idea of continual companionship with the woman, a physical communication. Shiva, the Phallic God, is, like Mahadeva and Parwati, male and female. He has even given one-half of his body to his consort Parwati as a dwelling place.[3] Inman[4] gives us a drawing of a Pundite of Ardanari-Iswara; one-half of the god is masculine, the other half feminine, and the genitals are in continuous cohabitation. The motive of continuous cohabitation is expressed in a well-known lingam symbol, which is to be found everywhere in Indian temples; the base is a female symbol, and within that is the phallus.[5] The symbol approaches very closely

the Grecian mystic phallic basket and chests (Compare with this the Eleusinian mysteries.) The chest or box is here a female symbol, that is, the mother's womb This is a very well-known conception in the old mythologies[6] The chest, basket or little basket, with its precious contents, was thought of as floating on the water, a remarkable inversion of the natural fact that the child floats in the amniotic fluid and that this is in the uterus

This inversion brings about a great advantage for sublimation, for it creates enormous possibilities of application for the myth-weaving phantasy, that is to say, for the annexation to the sun cycle The Sun floats over the sea like an immortal god, which every evening is immersed in the maternal water and is born again renewed in the morning Frobenius says

"Perhaps in connection with the blood-red sunrise, the idea occurs that here a birth takes place, the birth of a young son, the question than arises inevitably, whence comes the paternity? How has the woman become pregnant? And since this woman symbolizes the same idea as the fish, which means the sea, (because we proceed from the assumption that the Sun descends into the sea as well as arises from it) thus the curious primitive answer is that this sea has previously swallowed the old Sun Consequently the resulting myth is, that the woman (sea) has formerly devoured the Sun and now brings a new Sun into the world, and thus she has become pregnant"

All these sea-going gods are sun symbols They are enclosed in a chest or an ark for the "night journey on the sea" (Frobenius), often together with a woman (again an inversion of the actual situation, but in support of the motive of continuous cohabitation, which we have met above). During the night journey on the sea the Sun-god is enclosed in the mother's womb, oftentimes threatened by dangers of all kinds Instead of many individual examples, I will content myself with reproducing the scheme which Frobenius has constructed from numberless myths of this sort.



Frobenius gives the following legend to illustrate this:

"A hero is devoured by a water monster in the West (to devour) The animal carries him within him to the East (sea journey). Meanwhile he

kindles a fire in the belly of the monster (to set on fire) and since he feels hungry he cuts off a piece of the hanging heart (to cut off the heart). Soon after he notices that the fish glides upon the dry land (to land); he immediately begins to cut open the animal from within outwards (to open); then he slides out (to slip out). In the fish's belly, it had been so hot, that all his hair had fallen out (heat, hair). The hero frequently frees all who were previously devoured (to devour all) and all now slide out (slip out).

A very close parallel is Noah's journey during the flood, in which all living creatures die; only he and the life guarded by him are brought to a new birth. In a Melapolynesian legend (Frobenius) it is told that the hero in the belly of the King Fish took his weapon and cut open the fish's belly. "He slid out and saw a splendor, and he sat down and reflected. 'I wonder where I am,' he said. Then the sun rose with a bound and turned from one side to the other." The Sun has again slipped out. Frobenius mentions from the Ramayana the myth of the ape Hanuman, who represents the Sun-hero. "The sun in which Hanuman hurries through the air throws a shadow upon the sea. The sea monster notices this and through this draws Hanuman toward itself; when the latter sees that the monster is about to devour him, he stretches out his figure immeasurably; the monster assumes the same gigantic proportions. As he does that Hanuman becomes as small as a thumb, slips into the great body of the monster and comes out on the other side. In another part of the poem it is said that he came out from the right ear of the monster (like Rabelais' Gargantua, who also was born from the mother's ear). "Hanuman thereupon resumes his flight, and finds a new obstacle in another sea monster, which is the mother of Rahus, the sun-devouring demon. The latter draws Hanuman's shadow [7] to her in the same way. Hanuman again has recourse to the earlier stratagem, becomes small and slips into her body, but hardly is he there than he grows to a gigantic mass, swells up, tears her, kills her, and in that way makes his escape."

Thus we understand why the Indian fire-bringer Matâriçvan is called "the one swelling in the mother"; the ark (little box, chest, cask, vessel, etc.) is a symbol of the womb, just as is the sea, into which the Sun sinks for rebirth. From this circle of ideas we understand the mythologic statements about Ogyges; he it is who possesses the mother, the City, who is united with the mother; therefore under him came the great flood, for it is a typical fragment of the sun myth that the hero, when united with the woman attained with difficulty, is exposed in a cask and thrown into the sea, and then lands for a new life on a distant shore. The middle part, the "night journey on the sea" in the ark, is lacking in the tradition of Ogyges.[8] But the rule in mythology is that the typical parts of a myth can be united in all conceivable variations, which adds greatly to the extraordinary difficulty of the interpretation of a particular myth without knowledge of all the others. The meaning of this cycle of myths mentioned here is clear; it is the longing *to attain rebirth through the return to the mother's womb, that is to say,*

to become as immortal as the sun This longing for the mother is frequently expressed in our holy scriptures [9] I recall, particularly the place in the epistle to the Galatians, where it is said (iv. 26)

(26) "But Jerusalem which is above is free, which is the mother of us all
(27) "For it is written, Rejoice, thou barren that beareth not break forth and cry, thou that travailest not for the desolate hath many more children than she which hath an husband
(28) "Now we, brethren, as Isaac was, are the children of promise
(29) "But as he that was born after the flesh persecuted him that was born after the spirit, even so it is now
(30) "Nevertheless, what sayeth the scripture? Cast out the bondwoman and her son, for the son of a bondwoman shall not be heir with the son of a freewoman
(31) "So, then, brethren, we are not children of the bondwonan, but of the free"

Chapter v:

(1) "Stand fast therefore in the liberty wherewith Christ has made us free"

The Christians are the children of the City Above, a symbol of the mother, not sons of the earthly city-mother, who is to be cast out; for those born after the flesh are opposed to those born after the spirit, who are not born from the mother in the flesh, but from a symbol for the mother. One must again think of the Indians at this point, who say the first people proceeded from the sword-hilt and a shuttle The religious thought is bound up with the compulsion to call the mother no longer mother, but City, Source, Sea, etc. This compulsion can be derived from the need to manifest an amount of libido bound up with the mother, but in such a way that the mother is represented by or concealed in a symbol The symbolism of the city we find well-developed in the revelations of John, where two cities play a great part, one of which is insulted and cursed by him, the other greatly desired. We read in Revelation (xvii 1).

(1) "Come hither I will shew unto thee the judgment of the great whore that sitteth on many waters
(2) "With whom the kings of the earth have committed fornication and the inhabitants of the earth have been made drunk with the wine of her fornication
(3) "So he carried me away in the spirit into the wilderness. and I saw a woman sit on a scarlet colored beast, full of the names of blasphemy, and having seven heads and ten horns
(4) "And the woman was arrayed in purple and scarlet colors, and decked with gold and precious stones and pearls, having a golden cup [10] in her hand full of abominations and filthiness of her fornication
(5) "And upon her forehead was a name written *Mystery Babylon the great The Mother of Harlots and Abominations of the Earth*
(6) "And I saw the woman drunken with the blood of saints, and with the blood of the martyrs of Jesus: and when I saw her I wondered with a great admiration"

Here follows an interpretation of the vision unintelligible to us, from which we can only emphasise the point that the seven heads [11] of the dragon means the seven hills upon which the woman sits.

This is probably a distinct allusion to Rome, the city whose temporal power oppressed the world at the time of the Revelation. The waters upon which the woman "the mother" sits are "peoples and throngs and nations and tongues." This also seems to refer to Rome, for she is the mother of peoples and possessed all lands. Just as in common speech, for example, colonies are called daughters, so the people subject to Rome are like members of a family subject to the mother. In another version of the picture, the kings of the people, namely, the fathers, commit fornication with this mother. Revelation continues (xviii. 2):

(2) "And he cried mightily with a strong voice, saying, Babylon the Great is fallen, is fallen, and is become the habitation of devils, and the hold of every foul spirit, and a cage of every unclean and hateful bird.
(3) "For all nations have drunk of the wine of the wrath of her fornication."

Thus this mother does not only become the mother of all abominations, but also in truth the receptacle of all that is wicked and unclean. The birds are images of souls;[12] therefore, this means all souls of the condemned and evil spirits. Thus the mother becomes Hecate, the underworld, the City of the damned itself. We recognise easily in the ancient idea of the woman on the dragon,[13] the above-mentioned representation of Echidna, the mother of the infernal horrors. Babylon is the idea of the "terrible" mother, who seduces all people to whoredom with devilish temptation, and makes them drunk with her wine. The intoxicating drink stands in the closest relation to fornication, for it is also a libido symbol, as we have already seen in the parallel of fire and sun. After the fall and curse of Babylon, we find in Revelation (xix. 6-7) the hymn which leads from the under half to the upper half of the mother, where now everything is possible which would be impossible without the repression of incest.

(6) "Alleluia, the Lord God omnipotent reigneth.
(7) "Let us be glad and rejoice, and give honor to him: for the marriage of the Lamb is come,[14] and his wife hath made herself ready.
(8) "And to her was granted that she should be arrayed in fine linen, clean and white: for the fine linen is the righteousness of saints.
(9) "And he saith unto me, 'Write, Blessed are they which are called unto the marriage supper of the Lamb.'"

The Lamb is the son of man who celebrates his marriage with the "woman." Who the "woman" is remains obscure at first. But Revelation (xxi. 9) shows us which "woman" is the bride, the Lamb's wife.

(9) "Come hither, I will show thee the bride, the Lamb's wife.[15]
(10) "And he carried me away in the spirit to a great and high mountain, and showed me that great city, the holy Jerusalem, descending out of heaven from God, having the glory of God."

It is evident from this quotation, after all that goes before, that the City, the heavenly bride, who is here promised to the Son, is the

mother.[16] In Babylon the impure maid was cast out, according to the Epistle to the Galatians, so that here in heavenly Jerusalem the mother-bride may be attained the more surely. It bears witness to the most delicate psychologic perception that the fathers of the church who formulated the canons preserved this bit of the symbolic significance of the Christ mystery. It is a treasure house for the phantasies and myth materials which underlie primitive Christianity.[17] The further attributes which were heaped upon the heavenly Jerusalem make its significance as mother overwhelmingly clear:

(1) "And he shewed me a pure river of water of life, clear as crystal, proceeding out of the throne of God and of the Lamb.
(2) "In the midst of the street of it, and on either side of the river, was there the tree of life, which bare twelve manner of fruits, and yielded her fruit every month, and the leaves of the tree were for the healing of nations.
(3) "And there shall be no more curse."

In this quotation we come upon the symbol of the waters, which we found in the mention of Ogyges in connection with the city. The maternal significance of water belongs to the clearest symbolism in the realm of mythology,[18] so that the ancients could say: ἡ θάλασσα—τῆς γενέσεως σύμβολον.* From water comes life;[19] therefore, of the two gods which here interest us the most, Christ and Mithra, the latter was born beside a river, according to representations, while Christ experienced his new birth in the Jordan; moreover, he is born from the Πηγή,[20] the "sempiterni fons amoris," the mother of God, who by the heathen-Christian legend was made a nymph of the Spring. The "Spring" is also found in Mithracism. A Pannonian dedication reads, "Fonti perenni." An inscription in Apulia is dedicated to the "Fons Aeterni." In Persia, Ardvîçûra is the well of the water of life. Ardvîçûra-Anahita is a goddess of water and love (just as Aphrodite is born from foam). The neo-Persians designate the Planet Venus and a nubile girl by the name "Nahid." In the temples of Anaitis there existed prostitute Hierodules (harlots). In the Sakaeen (in honor of Anaitis) there occurred ritual combats as in the festival of the Egyptian Ares and his mother. In the Vedas the waters are called Mâtritamâh—the most maternal.[20] All that is living rises as does the sun, from the water, and at evening plunges into the water. Born from the springs, the rivers, the seas, at death man arrives at the waters of the Styx in order to enter upon the "night journey on the sea." The wish is that the black water of death might be the water of life; that death, with its cold embrace, might be the mother's womb, just as the sea devours the sun, but brings it forth again out of the maternal womb (Jonah motive[21]). Life believes not in death.

"In the flood of life, in the torrent of deeds,
I toss up and down,

* The sea is the symbol of birth.

> I am blown to and fro!
> Cradle and grave,
> An eternal sea,
> A changing web,
> A glowing life."
>
> —*Goethe: Faust.*

That ξύλον ζωῆς, the wood of life, or the tree of life, is a maternal symbol would seem to follow from the previous deductions. The etymologic connection of ὕω, ὕλη, υἱός, in the Indo-Germanic root suggests the blending of the meanings in the underlying symbolism of mother and of generation. The tree of life is probably, first of all, a fruit-bearing genealogical tree, that is, a mother-image. Countless myths prove the derivation of man from trees; many myths show how the hero is enclosed in the maternal tree—thus dead Osiris in the column, Adonis in the myrtle, etc. Numerous female divinities were worshipped as trees, from which resulted the cult of the holy groves and trees. It is of transparent significance when Attis castrates himself under a pine tree, *i. e.*, he does it because of the mother. Goddesses were often worshipped in the form of a tree or of a wood. Thus Juno of Thespiae was a branch of a tree, Juno of Samos was a board. Juno of Argos was a column. The Carian Diana was an uncut piece of wood. Athene of Lindus was a polished column. Tertullian calls Ceres of Pharos "rudis palus et informe lignum sine effigie." Athenaeus remarks of Latona at Delos that she is ξύλινον ἄμορφον, a shapeless piece of wood.[22] Tertullian calls an Attic Pallas "crucis stipes," a wooden pale or mast. The wooden pale is phallic, as the name suggests φάλης, Pallus. The φαλλός is a pale, a ceremonial lingam carved out of figwood, as are all Roman statues of Priapus. Φάλος means a projection or centrepiece on the helmet, later called κῶνος, just as ἀνα-φαλ-αντίασις signifies baldheadedness on the forepart of the head, and φαλακρος signifies baldheadedness in regard to the φάλος-κῶνος of the helmet, a semi-phallic meaning is given to the upper part of the head as well.[23] Φαλλήνιος has, besides φαλλός, the significance of "wooden"; φαλ-άγγωμα, "cylinder", φάλαγξ, "a round beam." The Macedonian battle array, distinguished by its powerful impetus, is called φάλαγξ; moreover, the finger-joint[24] is called φάλαγξ. φάλλαινα or φάλαινα is a whale. Now φαλος appears with the meaning "shining, brilliant." The Indo-Germanic root is *bhale*=to bulge, to swell.[25] Who does not think of Faust?

> "It grows, it shines, increases in my hand!"

That is primitive [illegible] which shows how immediate is the connection bet[illegible] and light. The same relations are found in the Rigveda in Rudra's utterances.

> *Rigveda* 1, 114, 3.
> "May we obtain your favour, thou man ruling, Oh urinating Rudra."

I refer here to the previously mentioned phallic symbolism of Rudra in the Upanishads.

(4) "We call for help below to the flaming Rudra, to the one bringing the sacrifice, him who encircles and wanders (wandering in the vault of Heaven) to the seer"

2, 33, 5

"He who opens up the sweet, who listens to our calls, the ruddy one, with the beautiful helmet, may he not give us over to the powers of jealousy

(6) "I have been rejoiced by the bull connected with Marut, the supplicating one with strong force of life

(8) "Sound the powerful song of praise to the ruddy bull to the white shining one, worship the flaming one with honor, we sing of the shining being Rudra

"May Rudra's missile (arrow) not be used on us, may the great displeasure of the shining one pass us by Unbend the firm (bow or hard arrow?) for the princes, thou who blessest with the waters of thy body (generative strength), be gracious to our children and grandchildren" -[8]

In this way we pass from the realm of mother symbolism imperceptibly into the realm of male phallic symbolism This element also lies in the tree, even in the family tree, as is distinctly shown by the mediæval family trees. From the first ancestor there grows upward, in the place of the "membrum virile," the trunk of the great tree. The bisexual symbolic character of the tree is intimated by the fact that in Latin trees have a masucline termination and a feminine gender [27] The feminine (especially the maternal) meaning of the forest and the phallic significance of trees in dreams is well known. I mention an example.

It concerns a woman who had always been nervous, and who, after many years of marriage, became ill as a result of the typical retention of the libido. She had the following dream after she had learned to know a young man of many engaging free opinions who was very pleasing to her She found herself in a garden where stood a remarkable exotic tree with strange red fleshy flowers or fruits She picked them and ate them. Then, to her horror, she felt that she was poisoned This dream idea may easily be understood by means of the antique or poetic symbolism, so I can spare information as to the analytic material

The double significance of the tree is readily explained by the fact that such symbols are not to be understood "anatomically" but psychologically as libido symbols, therefore, it is not permissible to interpret the tree on account of its similar form as directly phallic, it can also be called a woman or the uterus of the mother The uniformity of the significance lies alone in the similarity to the libido [28] One loses one's way in one "cul de sac" after another by saying that this is the symbol substituted for the mother and that for the penis In this realm there is no fixed significance of things The only reality here is the libido, for which "all that is perishable is merely a symbol" It is not the physical actual mother, but the libido of the son, the object of which was once the mother We take mythologic symbols much too concretely and wonder at every step about the endless contradictions These

contradictions arise only because we constantly forget that in the realm of phantasy "feeling is all" Whenever we read, therefore, "his mother was a wicked sorcerer," the translation is as follows The son is in love with her, namely, he is unable to detach his libido from the mother-imago, he therefore suffers from incestuous resistance.

The symbolism of water and trees, which are met with as further attributes in the symbol of the City, also refer to that amount of libido which unconsciously is fastened to the mother-imago In certain parts of Revelation the unconscious psychology of religious longing is revealed, namely, the longing for the *mother*[29] The expectation of Revelation ends in the mother καὶ πᾶν κατάθεμα οὐκ ἔσται ἔτι ("and there shall be no more curse") There shall be no more sins, no repression, no disharmony with one's self, no guilt, no fear of death and no pain of separation more!

Thus Revelation echoes that same radiant mystical harmony which was caught again 2,000 years later and expressed poetically in the last prayer of Dr Marianus

> "Penitents, look up, elate,
> Where she beams salvation
> Gratefully to blessed fate
> Grow, in recreation!
> Be our souls, as they have been,
> Dedicate to thee!
> Virgin Holy, Mother, Queen,
> Goddess, gracious be!" —*Goethe Faust*

One principal question arises at the sight of this beauty and greatness of feeling, that is, whether the primary tendency compensated by religion is not too narrowly understood as incestuous I have previously observed in regard to this that I consider the "resistance opposed to libido" as in a general way coincident with the incest prohibition I must leave open for the present the definition of the psychological incest conception However, I will here emphasise the point that it is most especially the totality of the sun myth which proves to us that the fundamental basis of the "incestuous" desire does not aim at cohabitation, but at the special thought of becoming a child again, of turning back to the parent's protection, of coming into the mother once more in order to be born again But incest stands in the path to this goal, that is to say, the necessity of in some way again gaining entrance into the mother's womb One of the simplest ways would be to impregnate the mother, and to reproduce one's self identically But here the incest prohibition interferes, therefore, the myths of the sun or of rebirth teem with all possible proposals as to how incest can be evaded A very simple method of avoidance is to transform the mother into another being or to rejuvenate[30] her after birth has occurred, to have her disappear again or have her change back It is not incestuous cohabitation which is desired, but the rebirth, which now

is attained most readily through cohabitation But this is not the only way, although perhaps the original one The resistance to the incest prohibition makes the phantasy inventive, for example, it was attempted to impregnate the mother by means of a magic charm of fertility (to wish for a child) Attempts in this respect remain in the stage of mythical phantasies, but they have one result, and that is the exercise of the phantasy which gradually produces paths through the creation of phantastic possibilities, in which the libido, taking an active part, can flow off Thus the libido becomes *spiritualised in an imperceptible manner* The power "which always wishes evil" thus creates a spiritual life Therefore, in religions, this course is now raised to a system On that account it is exceedingly instructive to see how religion takes pains to further these symbolic transferences[31] The New Testament furnishes us with an excellent example in regard to this Nicodemus, in the speech regarding rebirth, cannot forbear understanding the matter very realistically.

John iii 4
(4) "How can a man be born when he is old? Can he enter a second time into his mother's womb, and be born?"

But Jesus endeavours to raise into purity the sensuous view of Nicodemus's mind moulded in materialistic heaviness, and announces to him—really the same—and yet not the same

(5) "Verily, verily, I say unto thee, Except a man be born of water and of the spirit, he cannot enter into the kingdom of God
(6) "That which is born of the flesh is flesh and that which is born of the spirit is spirit
(7) "Marvel not that I said unto thee, Ye must be born again
(8) "The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh and whither it goeth, so is everyone that is born of the sprit"

To be born of water means simply to be born from the mother's womb To be born of the spirit means to be born from the fructifying breath of the wind, this we learn from the Greek text (where spirit and wind are expressed by the same word, πνεῦμα) τὸ γεγεννημένον ἐκ τῆς σαρκὸς σάρξ ἐστιν, καὶ τὸ γεγεννημένον ἐκ τοῦ πνεύματος πνεῦμά ἐστιν —Τὸ πνεῦμα ὅπου θέλει πνεῖ,* etc

This symbolism rose from the same need as that which produced the Egyptian legend of the vultures, the mother symbol They were only females and were fertilised by the wind One recognises very clearly the ethical demand as the foundation of these mythologia assertions *thou must say of the mother that she was not impregnated by a mortal in the ordinary way, but by a spiritual being in an unusual manner* This demand stands in strict opposition to the real truth, therefore, the myth is a fitting solution One

* That which is born of the flesh is flesh and that which is born of the spirit is spirit, the spirit bloweth where it listeth.

can say it was a hero who died and was born again in a remarkable manner, and in this way attained immortality The need which this demand asserts is evidently a prohibition against a definite phantasy concerning the mother A son may naturally think that a father has generated him in a carnal way, but not that he himself impregnated the mother and so caused himself to be born again into renewed youth This incestuous phantasy which for some reason possesses an extraordinary strength,[32] and, therefore, appears as a compulsory wish, is repressed and, conforming to the above demand, under certain conditions, expresses itself again, symbolically, concerning the problem of birth, or rather concerning individual rebirth from the mother. In Jesus's challenge to Nicodemus we clearly recognise this tendency. "Think not carnally or thou art carnal, but think symbolically, then art thou spirit" It is evident how extremely educative and developing this compulsion toward symbolism can be Nicodemus would remain fixed in low common places if he did not succeed in raising himself through symbols above this repressed incestuous desire. As a righteous philistine of culture, he probably was not very anxious for this effort, because men seem really to remain satisfied in repressing the incestuous libido, and at best to express it by some modest religious exercises Yet it seems to be important, on the other side, that man should not merely renounce and repress and thereby remain firmly fixed in the incestuous bond, but that he should redeem those dynamic forces which he bound up in incest, in order to fulfil himself For man needs his whole libido, to fill out the boundaries of his personality, and then, for the first time, he is in a condition to do his best The paths by which man may manifest his incestuously fixed libido seem to have been pointed out by the religious mythologic symbols On this account Jesus teaches Nicodemus "Thou thinkest of thy incestuous wish for rebirth, but thou must think that thou art born from the water and that thou art generated by the breath of the wind,[33] and in this way thou shalt share in eternal life."

Thus the libido which lies inactive in the incestuous bond repressed and in fear of the law and the avenging Father God can be led over into sublimation through the symbol of baptism (birth from water) and of generation (spiritual birth) through the symbol of the descent of the Holy Ghost Thus man becomes a child [34] again and is born into a circle of brothers and sisters, but his mother is the "communion of the saints," the church, and his circle of brothers and sisters is humanity, with whom he is united anew in the common inheritance of the primitive symbol.

It seems that at the time in which Christianity had its origin this process was especially necessary, for that period, as the result of the incredible contrast between slavery and the freedom of the citizens and masters, had entirely lost the consciousness of the common bond of mankind. One of the next and most essential reasons for the energetic regression to the infantile in Christianity,

which goes hand in hand with the revival of the incest problem, was probably to be found in the far-reaching depreciation of women. At that time sexuality was so easily attainable that the result could only be a very excessive depreciation of the sexual object The existence of personal values was first discovered by Christianity, and there are many people who have not discovered it even in the present day However, the depreciation of the sexual object hinders the outflow of that libido which cannot be satisfied by sexual activity, because it belongs to an already desexualised higher order (If it were not so, a Don Juan could never be neurotic, but the contrary is the case) For how might those higher valuations be given to a worthless, despised object? Therefore, the libido, after having seen a "Helen in every woman" for so long a time, sets out on a search for the difficult to obtain, the worshipped, but perhaps unattainable, goal, and which in the unconscious is the mother. Therefore the symbolic needs, based on the incest resistance, arise again in an increased degree, which promptly transforms the beautiful, sinful world of the Olympian Gods into incomprehensible, dreamlike, dark mysteries, which, with their accessions of symbols and obscure meaningful texts, remove us very far from the religious feelings of that Roman-Græco world When we see how much trouble Jesus took to make acceptable to Nicodemus the symbolic perception of things, that is to say, really a repression and veiling over of the actual facts, and how important it was for the history of civilisation in general, that people thought and still think in this way, then we understand the revolt which is raised everywhere against the psychologic discovery of the true background of the neurotic or normal symbolism Always and everywhere we encounter the odious realm of sexuality, which represents to all righteous people of to-day something defiled However, less than 2,000 years have passed since the religious cult of sexuality was more or less openly in full bloom To be sure, they were heathen and did not know better, but the nature of religious power does not change from cycle to cycle If one has once received an effectual impression of the sexual contents of the ancient cults, and if one realises oneself that the religious experience, that is, the union [35] with the God of antiquity, was understood by antiquity as a more or less concrete coitus, then truly one can no longer fancy that the motor forces of a religion have suddenly become wholly different since the birth of Christ Exactly the same thing has occurred as with the hysteric who at first indulges in some quite unbeautiful infantile sexual manifestations and afterwards develops a hyperæsthetic negation in order to convince every one of his special purity *Christianity, with its repression of the manifest sexual, is the negative of the ancient sexual cult* The original cult has changed its tokens [36] One only needs to realise how much of the gay paganism, even to the inclusion of unseemly Gods, has been taken into the Christian church Thus the old indecent Priapus

celebrated a gay festival of resurrection in St. Tychon.[37] Also partly in the physicians Sts. Kosmas and Damien, who graciously condescended to accept the "membra virilia" in wax at their festival.[38] St. Phallus of old memories emerges again to be worshipped in country chapels, to say nothing of the rest of the paganism!

There are those who have not yet learned to recognise sexuality as a function equivalent to hunger and who, therefore, consider it as disgraceful that certain taboo institutions which were considered as asexual refuges are now recognised as overflowing with sexual symbolism. Those people are doomed to the painful realisation that such is still the case, in spite of their great revolt. One must learn to understand that, opposed to the customary habit of thought, psychoanalytic thinking reduces and resolves those symbolic structures which have become more and more complicated through countless elaboration. This means a course of reduction which would be an intellectual enjoyment if the object were different. But here it becomes distressing, not only æsthetically, but apparently also ethically, because the repressions which are to be overcome have been brought about by our best intentions. We must commence to overcome our virtuousness with the certain fear of falling into baseness on the other side. This is certainly true, for virtuousness is always inwardly compensated by a great tendency towards baseness; and how many profligates are there who inwardly preserve a mawkish virtue and moral megalomania? Both categories of men turn out to be snobs when they come in contact with analytic psychology, because the moral man has imagined an objective and cheap verdict on sexuality and the unmoral man is entirely unaware of the vulgarity of his sexuality and of his incapacity for an unselfish love. One completely forgets that one can most miserably be carried away, not only by a vice, but also by a virtue. There is a fanatic orgiastic self-righteousness which is just as base and which entails just as much injustice and violence as a vice.

At this time, when a large part of mankind is beginning to discard Christianity, it is worth while to understand clearly why it was originally accepted. It was accepted in order to escape at last from the brutality of antiquity. As soon as we discard it, licentiousness returns, as impressively exemplified by life in our large modern cities. This step is not a forward step, but a backward one. It is as with individuals who have laid aside one form of transference and have no new one. Without fail they will occupy regressively the old path of transference, to their great detriment, because the world around them has since then essentially changed. He who is repelled by the historical and philosophical weakness of the Christian dogmatism and the religious emptiness of an historical Jesus, of whose person we know nothing and whose religious value is partly Talmudic, partly Hellenic wisdom, and discards Christianity, and therewith Christian morality, is certainly confronted with the ancient problem of licentiousness. To-day the individual still feels himself

restrained by the public hypocritical opinion, and, therefore, prefers to lead a secret, separate life, but publicly to represent morality. It might be different if men in general all at once found the moral mask too dull, and if they realised how dangerously their beasts lie in wait for each other, and then truly a frenzy of demoralisation might sweep over humanity This is the dream, the wish dream, of the morally limited man of to-day, he forgets necessity, which strangles men and robs them of their breath, and which with a stern hand interrupts every passion

It must not be imputed to me that I am wishing to refer the libido back by analytical reduction to the primitive, almost conquered, stages, entirely forgetting the fearful misery this would entail for humanity Indeed, some individuals would let themselves be transported by the old-time frenzy of sexuality, from which the burden of guilt has been removed, to their own greatest detriment

But these are the ones who under other circumstances would have prematurely perished in some other way However, I well know the most effectual and most inexorable regulator of human sexuality This is necessity With this leaden weight human lust will never fly too high

To-day there are countless neurotics who are so simply because they do not know how to seek happiness in their own manner. They do not even realise where the lack lies And besides these neurotics there are many more normal people—and percisely people of the higher type—who feel restricted and discontented For all these reduction to the sexual elements should be undertaken, in order that they may be reinstated into the possession of their primitive self, and thereby learn to know and value its relation to the entire personality In this way alone can certain requirements be fulfilled and others be repudiated as unfit because of their infantile character In this way the individual will come to realise that certain things are to be sacrificed, although they are accomplished, *but in another sphere* We imagine that we have long renounced, sacrificed and cut off our incest wish, and that nothing of it is left But it does not occur to us that this is not true, but that we unconsciously commit incest in another territory In religious symbols, for example, we come across incest [39] We consider the incestuous wish vanished and lost, and then rediscover it in full force in religion This process or transformation has taken place unconsciously in secular development Just as in Part I. it is shown that a similar unconscious transformation of the libido is an ethically worthless pose, and with which I compared the Christianity of early Roman antiquity, where evidently licentiousness and brutality were strongly resisted, so here I must remark in regard to the sublimation of the incestuous libido, that the belief in the religious symbol has ceased to be an ethical ideal, but it is an unconscious transformation of the incest wish into symbolic acts and symbolic concepts which cheat men, as it were, so that heaven appears to them as a father and earth as a

mother and the people upon it children and brothers and sisters. Thus man can remain a child for all time and satisfy his incest wish all unawares. This state would doubtless be ideal[40] if it were not infantile, and, therefore, merely a one-sided wish, which maintains a childish attitude. *The reverse is anxiety.* Much is said of pious people who remain unshaked in their trust in God and wander unswervingly safe and blessed through the world. I have never seen this Chidher yet. It is probably a wish figure. The rule is great uncertainty among believers, which they drown with fanatical cries among themselves or among others; moreover, they have, religious doubts, moral uncertainty, doubts of their own personality, feelings of guilt and, deepest of all, great fear of the opposite aspect of reality, against which the most highly intelligent people struggle with all their force. This other side is the devil, the adversary or expressed in modern terms, the corrective of reality, of the infantile world picture, which has been made acceptable through the predominating pleasure principle.[41] But the world is not a garden of God, of the Father, but a place of terrors. Not only is heaven no father and earth no mother and the people not brothers nor sisters, but they represent hostile, destroying powers, to which we are abandoned the more surely, the more childishly and thoughtlessly we have entrusted ourselves to the so-called Fatherly hand of God. One should never forget the harsh speech of the first Napoleon, that the good God is always on the side of the heaviest artillery.

The religious myth meets us here as one of the greatest and most significant human institutions which, despite misleading symbols, nevertheless gives man assurance and strength, so that he may not be overwhelmed by the monsters of the universe. The symbol, considered from the standpoint of actual truth, is misleading, indeed, but it is *psychologically true*,[42] because it was and is the bridge to all the greatest achievements of humanity.

But this does not mean to say that this unconscious way of transformation of the incest wish into religious exercises is the only one or the only possible one. There is also a conscious recognition and understanding with which we can take possession of this libido which is bound up in incest and transformed into religious exercises so that we no longer need the stage of religious symbolism for this end. It is thinkable that instead of doing good to our fellowmen, for "the love of Christ," we do it from the knowledge that humanity, even as ourselves, could not exist, if among the herd, the one could not sacrifice himself for the other. *This would be the course of moral autonomy, of perfect freedom, when man could without compulsion wish that which he must do, and this from knowledge, without delusion through belief in the religious symbols.*

It is a positive creed which keeps us infantile and, therefore, ethically inferior. Although of the greatest significance from the cultural point of view and of imperishable beauty from the æsthetic

standpoint, this delusion can no longer ethically suffice humanity striving after moral autonomy.

The infantile and moral danger lies in belief in the symbol because through that we guide the libido to an imaginary reality. The simple negation of the symbol changes nothing, for the entire mental disposition remains the same; we merely remove the dangerous object. But the object is not dangerous; the danger is our own infantile mental state, for love of which we have lost something very beautiful and ingenious through the simple abandonment of the religious symbol. I think *belief should be replaced by understanding*; then we would keep the beauty of the symbol, but still remain free from the depressing results of submission to belief. This would be the psychoanalytic cure for belief and disbelief.

The vision following upon that of the city is that of a "strange fir tree with gnarled branches." This vision does not seem extraordinary to us after all that we have learned of the tree of life and its associations with the city and the waters of life. This especial tree seems simply to continue the category of the mother symbols. The attribute "strange" probably signifies, as in dreams, a special emphasis, that is, a special underlying complex material. Unfortunately, the author gives us no individual material for this. As the tree already suggested in the symbolism of the city is particularly emphasised through the further development of Miss Miller's visions here, I find it necessary to discuss at some length the history of the symbolism of the tree.

It is well known that trees have played a large part in the cult myth from the remotest times. The typical myth tree is the tree of paradise or of life which we discover abundantly used in Babylonian and also in Jewish lore; and in prechristian times, the pine tree of Attis, the tree or trees of Mithra; in Germanic mythology, Ygdrasil and so on. The hanging of the Attis image on the pine tree; the hanging of Marsyas, which became a celebrated artistic motive; the hanging of Odin; the Germanic hanging sacrifices—indeed, the whole series of hanged gods—teaches us that the hanging of Christ on the cross is not a unique occurrence in religious mythology, but belongs to the same circle of ideas as others. In this world of imagery the cross of Christ is the tree of life, and equally the wood of death. This contrast is not astounding. Just as the origin of man from trees was a legendary idea, so there were also burial customs, in which people were buried in hollow trees. From that the German language retains even now the expression "Totenbaum" (tree of death) for a coffin. Keeping in mind the fact that the tree is predominantly a mother symbol, then the mystic significance of this manner of burial can be in no way incomprehensible to us. *The dead are delivered back to the mother for rebirth.* We encounter this symbol in the Osiris myth, handed down by Plutarch,[43] which is, in general, typical in various aspects. Rhea is pregnant with Osiris; at the same time also with Isis; Osiris and

Isis mate even in the mother's womb (motive of the night journey on the sea with incest). Their son is Arueris, later called Horus. It is said of Isis that she was born in "absolute humidity" (τεταρτη δε τῇν Ἶσιν ἐν πανύγροις γενέσθαι *). It is said of Osiris that a certain Pamyles in Thebes heard a voice from the temple of Zeus while drawing water, which commanded him to proclaim that Osiris was born μέγας βασιλεὺς εὐεργέτης Οσιρις †. In honor of this the Pamylion were celebrated. They were similar to the phallophorion. Pamyles is a phallic demon, similar to the original Dionysus. The myth reduced reads: Osiris and Isis were generated by phallus from the water (mother womb) in the ordinary manner. (Kronos had made Rhea pregnant, the relation was secret, and Rhea was his sister. Helios, however, observed it and cursed the relation.) Osiris was killed in a crafty manner by the god of the underworld, Typhon, who locked him in a chest. He was thrown into the Nile, and so carried out to sea. Osiris, however, mated in the underworld with his second sister, Nephthys (motive of the night journey to the sea with incest). One sees here how the symbolism is developed. In the mother womb, before the outward existence, Osiris commits incest; in death, the second intrauterine existence, Osiris again commits incest. Both times with a sister who is simply substituted for the mother as a legal, uncensured symbol, since the marriage with a sister in early antiquity was not merely tolerated, but was really commended. Zarathustra also recommended the marriage of kindred. This form of myth would be impossible to-day, because co-habitation with the sister, being incestuous, would be repressed. The wicked Typhon entices Osiris craftily into a box or chest; this distortion of the true state of affairs is transparent. The "original sin" caused men to wish to go back into the mother again, that is, the incestuous desire for the mother, condemned by law, is the ruse supposedly invented by Typhon. The fact is, the ruse is very significant. Man tries to sneak into rebirth through subterfuge in order to become a child again. An early Egyptian hymn [44] even raises an accusation against the mother Isis because she destroys the sun-god by Rê by treachery. It was interpreted as the ill-will of the mother towards her son that she banished and betrayed him. The hymn describes how Isis fashioned a snake, put it in the path of Rê, and how the snake wounded the sun-god with a poisonous bite, from which wound he never recovered, so that finally he had to retire on the back of the heavenly cow. But this cow is the cow-headed goddess, just as Osiris is the bull Apis. The mother is accused as if she were the cause of man flying to the mother in order to be cured of the wound which she had herself inflicted. This wound is the prohibition of incest.[45] Man is thus cut off from the hopeful certainty of childhood and early youth, from all the

* In the fourth place Isis was born in adsolute humidity.
† The great beneficent king, Osiris.

unconscious, instinctive happenings which permit the child to live as an appendage of his parents, unconscious of himself. There must be contained in this many sensitive memories of the animal age, where there was not any "thou shalt" and "thou shalt not," but all was just simple occurrence. Even yet a deep animosity seems to live in a man because a brutal law has separated him from the instinctive yielding to his desires and from the great beauty of the harmony of the animal nature. This separation manifested itself, among other things, in the incest prohibition and its correlates (laws of marriage, etc.); therefore pain and anger relate to the mother, as if she were responsible for the domestication of the sons of men. In order not to become conscious of his incest wish (his backward harking to the animal nature), the son throws all the burden of the guilt on the mother, from which arises the idea of the "terrible mother."[46] The mother becomes for him a spectre of anxiety, a nightmare.[47]

After the completed "night journey to the sea," the chest of Osiris was cast ashore by Byblos, and lay in the branches of an Erica, which grew around the coffin and became a splendid tree. The king of the land had the tree placed as a column under his roof.[48] During this period of Osiris's absence (the winter solstice) the lament customary during thousands of years for the dead god and his return occurs, and its εὕρεσις is a feast of joy. A passage from the mournful quest of Isis is especially noteworthy:

"She flutters like a swallow lamenting around the column, which encloses the god sleeping in death."

(This same motive returns in the Kyffhauser saga.)

Later on Typhon dismembers the corpse and scatters the pieces. We come upon the *motive of dismemberment* in countless sun myths,[49] namely, the inversion of the idea of the composition of the child in the mother's womb.[50] In fact, the mother Isis collects the pieces of the body with the help of the jackal-headed Anubis. (She finds the corpse with the help of dogs.) Here the nocturnal devourers of bodies, the dogs and jackals, become the assistants of the composition, of the reproduction.[51] The Egyptian vulture owes its symbolic meaning as mother to this necrophagic habit. In Persian antiquity the corpses were thrown out for the dogs to devour, just as to-day in the Indian funeral pyres the removal of the carcasses is left to the vultures. Persia was familiar with the custom of leading a dog to the bed of one dying, whereupon the latter had to present the dog with a morsel.[52] The custom, on its surface, evidently signifies that the morsel is to belong to the dog, so that he will spare the body of the dead, precisely as Cerverus was soothed by the honey-cakes which Hercules gave to him in the journey to hell. But when we bear in mind the jackal-headed Anubis who rendered his good services in the gathering together of the dismembered Osiris, and the mother significance of the vulture, then

the question arises whether something deeper was not meant by this ceremony. Creuzer has also concerned himself with this idea, and has come to the conclusion that the astral form of the dog ceremony, that is, the appearance of Sirius, the dog star, at the period of the sun's highest position, is related to this in that the introduction of the dog has a compensatory significance, death being thereby made, reversedly, equal to the sun's highest position. This is quite in conformity with psychologic thought, which results from the general fact that death is interpreted as entrance into the mother's womb (rebirth). This interpretation would seem to be supported by the otherwise enigmatic function of the dog in the Sacrificium Mithriacum. In the monuments a dog always leaps up upon the bull killed by Mithra. However, this sacrifice is probably to be interpreted through the Persian legend, as well as through the monument, as the moment of the *highest fecundity*. The most beautiful expression of this is seen upon the magnificent Mithra relief of Heddernheim. Upon one side of a large stone slab (formerly probably rotating) is seen the stereotyped overthrowing and sacrifice of the bull, but upon the other side stands Sol, with a bunch of grapes in his hand, Mithra with the cornucopia, the Dadophores with fruits, corresponding to the legend that all fecundity proceeds from the dead bull of the world, fruits from the horns, wine from its blood, grain from the tail, cattle from its sperma, leek from its nose, and so on. Silvanus stands above this scene with the animals of the forest arising from him. The significance suspected by Creuzer might very easily belong to the dog in this connection.[53] Let us now turn back to the myth of Osiris. In spite of the restoration of the corpse accomplished by Isis, the resuscitation succeeds only incompletely in so far as the phallus of Osiris cannot again be produced, because it was eaten by the fishes; the power of life was wanting.[54] Osiris as a phantom once more impregnated Isis, but the fruit is Harpocrates, who was feeble in τοῖς κάτωθεν γυίοις (in the lower limbs), that is, corresponding to the significance of γυῖον (at the feet). (Here, as is plainly evident, foot is used in the phallic meaning.) This incurability of the setting sun corresponds to the incurability of Rê in the above-mentioned older Egyptian sun hymn. Osiris, although only a phantom, now prepares the young sun, his son Horus, for a battle with Typhon, the evil spirit of darkness. Osiris and Horus correspond to the father-son symbolism mentioned in the beginning, which symbolic figure, corresponding again to the above formulation,[55] is flanked by the well-formed and ugly figures of Horus and Harpocrates, the latter appearing mostly as a cripple, often represented distorted to a mere caricature.[56]

He is confused in the tradition very much with Horus, with whom he also has the name in common. Hor-pi-chrud, as his real name[57] reads, is composed from *chrud*, "child," and *Hor*, from the adjective *hri*=up, on top, and signifies the up-coming child, as the rising sun, and opposed to Osiris, who personifies the setting sun—the sun of



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the west. Thus Osiris and Horpichrud or Horus are one being, both husband and son of the same mother, Hathor-Isis The Chnum-Ra, the sun god of lower Egypt, represented as a ram, has at his side, as the female divinity of the land, Hatmehit, who wears the fish on her head She is the mother and wife of Bi-neb-did (Ram, local name of Chnum-Ra) In the hymn if Hibis,[58] Amon-ra was invoked

"Thy (Chum-Ram) dwells in Mendes, united as the quadruple god Thmuis He is the phallus, the lord of the gods The bull of his mother rejoices in the cow (ahet, the mother) and man fructifies through his semen"

In further inscriptions Hatmehit was directly referred to as the "mother of Mendes" (Mendes is the Greek form of Bi-neb-did ram) She is also invoked as the "Good," with the additional significance of *ta-nofert*, or "young woman" The cow as symbol of the mother is found in all possible forms and variations of Hathor-Isis, and also in the female Nun (parallel to this is the primitive goddess Nit or Neith), the protoplasm which, related to the Hindoo Atman,[59] is equally of masculine and feminine nature Nun is, therefore, invoked as Amon,[60] the original water,[61] which is in the beginning He is also designated as the father of fathers, the mother of mothers To this corresponds the invocation to the female side of Nun-Amon, of Nit or Neith

"Nit, the ancient, the mother of god, the mistress of Esne, the father of fathers, the mother of mothers, who is the beetle and the vulture, the being in its beginning

"Nit, the ancient, the mother who bore the light god, RÂ, who bore first of all, when there was nothing which brought forth

"The cow, the ancient, which bore the sun, and then laid the germ of gods and men"

The word "nun" has the significance of young, fresh, new, also the on-coming waters of the Nile flood In a transferred sense "nun" was also used for the chaotic primitive waters, in general for the primitive generating matter [62] which was personified by the goddess Nunet From her Nut sprang, the goddess of heaven, who was represented with a starry body, and also as the heavenly cow with a starry body

When the sun-god, little by little, retires on the back of the heavenly cow, just as poor Lazarus returns into Abraham's bosom, each has the same significance, they return into the mother, in order to rise as Horus Thus it can be said that in the morning the goddess is the mother, at noon the sister-wife, and in the evening again the mother, who receives the dying in her lap, reminding us of the Pietà of Michelangelo As shows by the illustration (from Dideron's "Iconographie Chretienne"), this thought has been transferred as a whole into Christianity.

Thus the fate of Osiris is explained. he passes into the mother's womb, the chest, the sea, the tree, the column of Astartes, he is

dismembered, re-formed, and reappears again in his son, Hor-pi-chrud

Before entering upon the further mysteries which the beautiful myth reveals to us, there is still much to be said about the symbol of the tree Osiris lies in the branches of the tree, surrounded by them, as in the mother's womb The motive of *embracing and entwining* is often found in the sun myths, meaning that it is the *myth of rebirth* A good example is the Sleeping Beauty, also the legend of the girl who is enclosed between the bark and the trunk, but who is freed by a youth with his horn [63] The horn is of gold and silver, which hints at the sunbeam in the phallic meaning (Compare the previous legend of the horn) An exotic legend tells of the sun-hero, how he must be freed from the plant entwining around him [64] A girl dreams of her lover who has fallen into the water, she tries to save him, but first has to pull seaweed and sea-grass from the water, then she catches him In an African myth the hero, after his act, must first be disentangled from the seaweed In a Polynesian myth the hero's ship was encoiled by the tentacles of a gigantic polyp Rê's ship is encoiled by a night serpent on its night journey on the sea In the poetic rendering of the history of Buddha's birth by Sir Edwin Arnold ("The Light of Asia," p 5) the motive of an embrace is also found

> " Queen Maya stood at noon, her days fulfilled,
> Under a Palso in the palace grounds,
> A stately trunk, straight as a temple shaft,
> With crown of glossy leaves and fragrant blooms,
> And knowing the time come—for all things knew—
> The conscious tree bent down its boughs to make
> A bower about Queen Maya's majesty
> And earth put forth a thousand sudden flowers
> To spread a couch while ready for the bath
> The rock hard by gave out a limpid stream
> Of crystal flow So brought she forth the child " [65]

We come across a very similar motive in the cult legend of the Samian Hera Yearly it was claimed that the image disappeared from the temple, was fastened somewhere on the seashore on a trunk of a Lygos tree and wound about with its branches There it was "found" and was treated with wedding-cake This feast is undoubtedly a ἱερὸς γάμος (ritual marriage), because in Samos there was a legend that Zeus had first had a long-continued secret love relation with Hera In Plataea and Argos, the marriage procession was represented with bridesmaids, marriage feast, and so on The festival took place in the wedding month "Γαμηλιών" (beginning of February) But in Plataea the image was previously carried into a lonely place in the wood, approximately corresponding to the legend of Plutarch that Zeus had kidnapped Hera and then had hidden her in a cave of Cithaeron. According to our deductions, previously made, we must conclude from this that there is still another train of thought, namely, the magic charm of rejuvenation,

which is condensed in the Hierosgamos The disappearance and hiding in the wood, in the cave, on the seashore, entwined in a willow tree, points to the death of the sun and rebirth The early springtime Γαμηλιών (the time of Marriage) in February fits in with that very well In fact, Pausanias informs us that the Aigivan Hera *became a maiden again by a yearly bath in the spring of Canathos* The significance of the bath is emphasised by the information that in the Plataeian cult of Hera Teleia, Tritonian nymphs appeared as water-carriers In a tale from the Iliad, where the conjugal couch of Zeus upon Mount Ida is described, it is said [66]

> " The son of Saturn spake, and took his wife
> Into his arms, while underneath the pair,
> The sacred Earth threw up her freshest herbs ·
> The dewy lotos, and the crocus flower,
> And thick and soft the hyacinth All these
> Upbore them from the ground Upon this couch
> They lay, while o'er them a bright golden cloud
> Gathered and shed its drops of glistening dew
> So slumbered on the heights of Gargarus
> The All-Father overcome by sleep and love,
> And held his consort in his arms "
>
> —Trans by W C Bryant

Drexler recognises in this description an unmistakable allusion to the garden of the gods on the extreme western shore of the ocean, an idea which might have been taken from a Prehomeric Hierosgamos hymn This western land is the land of the setting sun, whither Hercules, Gilgamesh, etc , hasten with the sun, in order to find there immortality, where the sun and the maternal sea unite in an eternally rejuvenating intercourse Our supposition of a condensation of the Hierosgamos with the myth of rebirth is probably confirmed by this Pausanias mentions a related myth fragment where the statue of Artemis Orthia is also called Lygodesma (chained with willows), because it was found in a willow tree , this tale seems to be related to the general Greek celebration of Hierosgamos with the above-mentioned customs [67]

The motive of the " devouring " which Frobenius has shown to be a regular constituent of the sun myths is closely related to this (also metaphorically) The " whale dragon " (mother's womb) always " devours " the hero The devouring may also be partial instead of complete

A six-year-old girl, who goes to school unwillingly, dreams that her leg is encircled by a large red worm She had a tender interest for this creature, contrary to what might be expected An adult patient, who cannot separate from an older friend on account of an extraordinarily strong mother transference, dreams that " she had to get across some deep water (typical idea !) with this friend , her friend fell in (mother transference) , she tries to drag her out, and almost succeeds, but a large crab seizes on the dreamer by the foot and tries to pull her in "

Etymology also confirms this conception: There is an Indo Germanic root *vélu-*, *vel-*, with the meaning of "encircling, surrounding, turning." From this is derived Sanskrit *val*, *valati*=to cover, to surround, to encircle, to encoil (symbol of the snake), *valli*= creeping plant, *ulûta*=boa-constrictor=Latin *volûtas*, Lithuanian *velù*, *velti*=*wickeln* (to roll up); Church Slavonian *vlina*=Old High German, *wella*=*Welle* (wave or billow). To the root *velu* also belongs the root *vlvo*, with the meaning "cover, corium womb" (The serpent on account of its casting its skin is an excellent symbol of rebirth) Sanskrit *ulva*, *ulba* has the meaning, Latin *volva*, *volvula*, *vulva* To *velu* also belongs the root *ulvorâ*, with the meaning of "fruitful field, covering or husk of plants, sheath" Sanskrit *urvárâ*=sown field Zend *urvara*=plant (See the personification of the ploughed furrow) The same root *vel* has also the meaning of "wallen" (to undulate) Sanskrit *ulmuka*=conflagration *Fαλέα*, *Fέλα*, Gothic *vulan*=wallen (to undulate) Old High German and Middle High German *walm*=heat, glow [68] It is typical that in the state of "involution" the hair of the sun-hero always falls out from the heat Further the root *vel* is found with the meaning "to sound,[69] and to will, to wish" (libido!)

The motive of encoiling is mother symbolism [70] This is verified by the fact that the trees, for example, bring forth again (like the whale in the legend of Jonah) They do that very generally, thus in the Greek legend the Μελίαι νύμφαι * of the ash trees are the mothers of the race of men of the Iron Age In northern mythology, Askr, the ash tree, is the primitive father His wife, Embla, is the "Emsige," the active one, and not, as was earlier believed, the aspen *Askr* probably means, in the first place, the phallic spear of the ash tree (Compare the Sabine custom of parting the brides' hair with the lance) The Bundehesh symbolises the first people, Meschia and Meschiane, as the tree Reivas, one part of which places a branch in a hole of the other part. The material which, according to the northern myth, was animated by the god when he created men [71] is designated as *trê*=wood, tree [72] I recall also ὕλη=wood, which in Latin is called *materia* In the wood of the "world ash," Ygdrasil, a human pair hid themselves at the end of the world from whom sprang the race of the renewed world [73] The Noah motive is easily recognised in this conception (the night journey on the sea), at the same time, in the symbol of Ygdrasil, a mother idea is again apparent At the moment of the destruction of the world the "world-ash" becomes the guardian mother, the tree of death and life, one "ἐγκόλπιον"† [74] This function of rebirth of the "world-ash" also helps to elucidate the representation met with in the Egyptian Book of the Dead, which is called "the gate of knowledge of the soul of the East":

* Melian Virgins † Pregnant



CHRIST ON THE TREE OF LIFE

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"I am the pilot in the holy keel, I am the steer man who allows no rest in the ship of Rā [74] I know that tree of emerald green from whose midst Rā rises to the height of the clouds" [76]

Ship and tree of the dead (death ship and death tree) are here closely connected The conception is that Ra, born from the tree, ascends (Osiris in the Erika) The representation of the sun-god Mithra is probably explained in the same way He is represented upon the Heddernheim relief, with half his body arising from the top of a tree (In the same way numerous other monuments show Mithra half embodied in the rock, and illustrate a rock birth, similar to Men) Frequently there is a stream near the birthplace of Mithra This conglomeration of symbols is also found in the birth of Aschanes, the first Saxon king, who grew from the Harz rocks, which are in the midst of the wood [77] near a fountain [78] Here we find all the mother symbols united—earth, wood, water, three forms of tangible matter We can wonder no longer that in the Middle Ages the tree was poetically addressed with the title of honor, " mistress." Likewise it is not astonishing that the Christian legend transformed the tree of death, the cross, into the tree of life, so that Christ was often represented on a living and fruit-bearing tree. This reversion of the cross symbol to the tree of life, which even in Babylon was an important and authentic religious symbol, is also considered entirely probable by Zockler,[79] an authority on the history of the cross The pre-Christian meaning of the symbol does not contradict this interpretation; on the contrary, its meaning is life The appearance of the cross in the sun worship (here the cross with equal arms, and the swastika cross, as representative of the sun's rays), as well as in the cult of the goddess of love (Isis with the crux ansata, the rope, the speculum veneris ♀, etc), in no way contradicts the previous historical meaning. The Christian legend has made abundant use of this symbolism.

The student of mediæval history is familiar with the representation of the cross growing above the grave of Adam The legend was that Adam was buried on Golgotha Seth had planted on his grave a branch of the " paradise tree," which became the cross and tree of death of Christ [80] We all know that through Adam's guilt sin and death came into the world, and Christ through his death has redeemed us from the guilt. To the question in what had Adam's guilt consisted it is said that the unpardonable sin to be expiated by death was that he dared to pick a fruit from the paradise tree [81] The results of this are described in an Oriental legend. One to whom it was permitted to cast one look into Paradise after the fall saw the tree there and the four streams But the tree was withered, and in its branches lay an infant (The mother had become pregnant [82])

This remarkable legend corresponds to the Talmudic tradition that Adam, before Eve, already possessed a demon wife, by name Lilith, with whom he *quarrelled for mastership* But Lilith raised

herself into the air through the magic of the name of God and hid herself in the sea. Adam forced her back with the help of three angels.[83] Lilith became a nightmare, a Lamia, who threatened those with child and who kidnapped the newborn child. The parallel myth is that of the Lamias, the spectres of the night, who terrified the children. The original legend is that Lamia enticed Zeus, but the jealous Hera, however, caused Lamia to bring only dead children into the world. Since that time the raging Lamia is the persecutor of children, whom she destroys wherever she can. This motive frequently recurs in fairy tales, where the mother often appears directly as a murderess or as a *devourer of men*;[84] a German paradigm is the well-known tale of Hansel and Gretel. Lamia is actually a large, voracious fish, which establishes the connection with the whale-dragon myth so beautifully worked out by Frobenius, in which the sea monster devours the sun-hero for rebirth and where the hero must employ every stratagem to conquer the monster. Here again we meet with the idea of the "terrible mother" in the form of the voracious fish, the mouth of death.[85] In Frobenius there are numerous examples where the monster has devoured not only men but also animals, plants, an entire country, all of which are redeemed by the hero to a glorious rebirth.

The Lamias are typical nightmares, the feminine nature of which is abundantly proven.[86] Their universal peculiarity is that they ride upon their victims. Their counterparts are the spectral horses which bear their riders along in a mad gallop. One recognises very easily in these symbolic forms the type of anxious dream which, as Riklin shows,[87] has already become important for the interpretation of fairy tales through the investigation of Laistner.[88] The typical riding takes on a special aspect through the results of the analytic investigation of infantile psychology; the two contributions of Freud and myself[89] have emphasised, on one side, the anxiety significance of the horse, on the other side the sexual meaning of the phantasy of riding. When we take these experiences into consideration, we need no longer be surprised that the maternal "world-ash" Ygdrasil is called in German "the frightful horse." Cannegieter[90] says of nightmares:

> "Abigunt eas nymphas (matres deas, mairas) hodie rustici osse capitis equini tectis injecto, cujusmodi ossa per has terras in rusticorum villis crebra est animadvertere. Nocte autem ad concubia equitare creduntur et equos fatigare ad longinqua itinera." *

The connection of nightmare and horse seems, at first glance, to be present also etymologically—nightmare and mare. The Indo-Germanic root for mare is *mark*. Mare is the horse, English mare;

* Even to-day the country people drive off these nymphs (mother goddesses, Maira) by throwing a bone of the head of a horse upon the roof—bones of this kind can often be seen throughout the land on the farm houses of the country people. By night, however, they are believed to ride at the time of the first sleep, and they are believed to tire out their horses by long journeys.

Old High German *marah* (male horse) and *meriha* (female horse); Old Norse *merr* (*mara*=nightmare); Anglo-Saxon *myre* (*mara*). The French "cauchemar" comes from *calcare* = to tread, to step (of iterative meaning, therefore, "to tread" or press down). It was also said of the cock who stepped upon the hen. This movement is also typical for the nightmare; therefore, it is said of King Vanlandi, "Mara trad han," the Mara trod on him in sleep even to death.[91] A synonym for nightmare is the "troll" or "treter"[92] (treader). This movement (*calcare*) is proven again by the experience of Freud and myself with children, where a special infantile sexual significance is attached to stepping or kicking.

The common Aryan root *mar* means "to die"; therefore, *mara* the "dead" or "death." From this results *mors*, μόρος = fate (also μοῖρα[93]). As is well known, the Nornes sitting under the "world-ash" personify fate like Clotho, Lachesis and Atropos. With the Celts the conception of the Fates probably passes into that of *matres* and *matronæ*, which had a divine significance among the Germans. A well-known passage in Julius Cæsar ("De Bello Gallico," i. 50) informs us of this meaning of the mother:

"Ut matres familias eorum sortibus et vaticinationibus[94] declarent utrum prœlium committi ex usu esset, nec ne." *

In Slav *mara* means "witch"; poln. *mora*=demon, nightmare; *mōr* or *mōre* (Swiss-German) means "sow," also as an insult. The Bohemian *mura* means "nightmare" and "evening moth, Sphinx." This strange connection is explained through analysis where it often occurs that animals with movable shells (Venus shell) or wings are utilised for very transparent reasons as symbols of the female genitals.[95] The Sphingina are the twilight moths; they, like the nightmare, come in the darkness. Finally, it is to be observed that the sacred olive tree of Athens is called "μορία" (that was derived from μόρος). Halirrhotios wished to cut down the tree, but killed himself with the axe in the attempt.

The sound resemblance of *mar, mère* with *meer*=sea and Latin *mare*=sea is remarkable, although etymologically accidental. Might it refer back to "the great primitive idea of the mother" who, in the first place, meant to us our individual world and afterwards became the symbol of all worlds? Goethe said of the mothers: "They are encircled by images of all creatures." The Christians, too, could not refrain from reuniting their mother of God with water. "Ave Maris stella" is the beginning of a hymn to Mary. Then again it is the horses of Neptune which symbolise the waves of the sea. It is probably of importance that the infantile word ma-ma (mother's breast) is repeated in its initial sound in all possible languages, and that the mothers of two religious heroes are called Mary and Maya. That the mother is the horse of the child is to be seen most plainly in the primitive custom of carrying the child on the

* That these matrons should declare by lots whether it would be to their advantage or not to engage in battle.

back or letting it ride on the hip. Odin hung on the "world-ash," the mother, his "horse of terror." The Egyptian sun-god sits on the back of his mother, the heavenly cow.

We have already seen that, according to Egyptian conceptions, Isis, the mother of god, played an evil trick on the sun-god with the poisonous snake; also Isis behaved treacherously toward her son Horus in Plutarch's tradition. That is, Horus vanquished the evil Typhon, who murdered Osiris treacherously (terrible mother = Typhon). Isis, *however, set him free again.* Horus thereupon rebelled, *laid hands on his mother and tore the regal ornaments from her head,* whereupon Hermes gave her a cow's head. Then Horus conquered Typhon a second time. Typhon, in the Greek legend, is a monstrous dragon. Even without this confirmation it is evident that the battle of Horus is the typical battle of the sun-hero with the whale-dragon. Of the latter we know that it is a symbol of the "dreadful mother," of the voracious jaws of death, where men are dismembered and ground up.[96] Whoever vanquishes this monster has gained a new or eternal youth. For this purpose one must, in spite of all dangers, descend into the belly of the monster[97] (journey to hell) and spend some time there. (Imprisonment by night in the sea.)

The battle with the night serpent signifies, therefore, the conquering of the mother, who is suspected of an infamous crime, that is, the betrayal of the son. A full confirmation of the connection comes to us through the fragment of the Babylonian epic of the creation, discovered by George Smith, mostly from the library of Asurbanipal. The period of the origin of the text was probably in the time of Hammurabi (2,000 B.C.). We learn from this account of creation[98] that the sun-god Ea, the son of the depths of the waters and the god of wisdom,[99] had conquered Apsû. Apsû is the creator of the great gods (he existed in the beginning in a sort of trinity with Tiâmat—the mother of gods and Mumu, his vizier). Ea conquered the father, but Tiâmat plotted revenge. She prepared herself for battle against the gods:

"Mother Hubur, who created everything,
Procured invincible weapons, gave birth to giant snakes
With pointed teeth, relentless in every way;
Filled their bellies with poison instead of blood,
Furious gigantic lizards, clothed them with horrors,
Let them swell with the splendour of horror, formed them rearing.
Whoever sees them shall die of terror.
Their bodies shall rear without turning to escape.
She arrayed the lizards, dragons and Lahamen,
Hurricanes, mad dogs, scorpion men,
Mighty storms, fishmen and rams
With relentless weapons, without fear of conflict,
Powerful are Tiâmat's commands, irresistible are they.

"After Tiâmat had powerfully done her work
She conceived evil against the gods, her descendants.
In order to revenge Apsu, Tiamat did evil.

When Ea now heard this thing
He became painfully anxious, sorrowfully he sat himself
He went to the father, his creator, Ansar,
To relate to him all that Tiâmat plotted
Tiâmat, our mother, has taken an aversion to us,
Has prepared a riotous mob, furiously raging "

The gods finally opposed Marduk, the god of spring, the victorious sun, against the fearful host of Tiamat. Marduk prepared for battle Of his chief weapon, which he created, it is said

" He created the evil wind, Imhullu, the south storm and the hurricane,
The fourth wind, the seventh wind the whirlwind and the harmful wind,
Then let he loose the winds which he had created, the seven
To cause confusion within Tiâmat they followed behind him,
Then the lord took up the cyclone, his great weapon,
For his chariot he mounted the stormwind, the incomparable, the terrible one "

His chief weapon is the wind and a net, with which he will entangle Tiâmat He approaches Tiamat and challenges her to a combat.

" Then Tiâmat and Marduk, the wise one of the gods, came together,
Rising for the fight, approaching to the battle
Then the lord spread out his net and caught her
He let loose the Imhullu in his train at her face,
Then Tiâmat now opened her mouth as wide as she could
He let the Imhullu rush in so that her lips could not close,
With the raging winds he filled her womb
Her inward parts were seized and she opened wide her mouth
He touched her with the spear, dismembered her body,
He slashed her inward parts, and cut out her heart,
He threw down her body and stepped upon it "

After Marduk slew the mother, he devised the creation of the world.

" There the lord rested contemplating her body,
Then divided he the Colossus, planning wisely
He cut it apart like a flat fish, into two parts,[100]
One half he took and with it he covered the Heavens "

In this manner Marduk created the universe from the mother It is clearly evident that the killing of the mother-dragon here takes place under the idea of a wind fecundation with negative accompaniments

The world is created from the mother, that is to say, from the libido taken away from the mother through sacrifice. We shall have to consider this significant formula more closely in the last chapter The most interesting parallels to this primitive myth are to be found in the literature of the Old Testament, as Gunkel [101] has brilliantly pointed out It is worth while to trace the psychology of these parallels

Isaiah li 9

(9) " Awake, awake, put on strength, O arm of the Lord, awake as in the ancient days, in the generation of old Art thou not it that hath cut Rahab and wounded the dragon ?

(10) "Art thou not it which hath dried the sea, the waters of the great deep, that hath made the depths of the sea a way for the ransomed to pass over?"

The name of Rahab is frequently used for Egypt in the Old Testament, also dragon. Isaiah, chapter xxx, verse 7, calls Egypt "the silent Rahab," and means, therefore, something evil and hostile. Rahab is the well-known whore of Jericho, who later, as the wife of Prince Salma, became the ancestress of Christ. Here Rahab appeared as the old dragon, as Tiâmat, against whose evil power Marduk, or Jehovah, marched forth. The expression "the ransomed" refers to the Jews freed from bondage, but it is also mythological, for the hero again frees those previously devoured by the whale. (Frobenius.)

Psalm lxxxix. 10.

"Thou hast broken Rahab in pieces, as one that is slain."

Job xxvi. 12-13.

"He divided the sea with his power, and by his understanding he smiteth through the proud."

"By his spirit he hath garnished the heavens, his hand hath formed the crooked serpent."

Gunkel places Rahab as identical with Chaos, that is, the same as Tiâmat. Gunkel translates "the breaking to pieces" as "violation." Tiamat or Rahab as the mother is also the whore. Gilgamesh treats Ischtar in this way when he accuses her of whoredom. This insult towards the mother is very familiar to us from dream analysis. The dragon Rahab appears also as Leviathan, the water monster (maternal sea).

Psalm lxxiv.

(13) "Thou didst divide the sea by thy strength; thou brakest the heads of the dragons in the waters.

(14) "Thou brakest the heads of Leviathan in pieces and gavest him to be meat to the people inhabiting the wilderness.

(15) "Thou didst cleave the fountain and the flood: thou didst dry up mighty rivers."

While only the phallic meaning of the Leviathan was emphasised in the first part of this work, we now discover also the maternal meaning. A further parallel is:

Isaiah xxvii. 1.

"In that day, the Lord with his cruel and great and strong sword shall punish Leviathan, the piercing serpent, even Leviathan that crooked serpent, and he shall slay the dragon that is in the sea."

We come upon a special motive in Job, chap. xli, v. 1:

"Canst thou draw out Leviathan with an hook? or his tongue with a cord which thou lettest down? Canst thou put an hook in his nose? or bore his jaw through with a thorn?"

Numerous parallels to this motive are to be found among exotic myths in Frobenius, where the maternal sea monster was also fished

for The comparison of the mother libido with the elementary powers of the sea and the powerful monsters borne by the earth show how invincibly great is the power of that libido which we designate as maternal

We have already seen that the incest prohibition prevents the son from reproducing himself through the mother But this must be done by the god, as is shown with remarkable clearness and candour in the pious Egyptian mythology, which has preserved the most ancient and simple concepts Thus Chnum, the "moulder," the "potter," the "architect," moulds his egg upon the potter's wheel, for he is "the immortal growth," "the reproduction of himself and his own rebirth, the creator of the egg, which emerged from the primitive waters." In the Book of the Dead it says

"I am the sublime falcon (the Sun-god), which has come forth from his egg"

Another passage in the Book of the Dead reads

"I am the creator of Nun, who has taken his place in the underworld My nest is not seen and my egg is not broken"

A further passage reads

'that great and noble god in his egg who is his own originator of that which has arisen from him"[102]

Therefore the god Nagaga-uer is also called the "great cackler" (Book of the Dead) "I cackle like a goose and I whistle like a falcon" The mother is reproached with the incest prohibition as an act of wilful maliciousness by which she excludes the son from immortality Therefore, a god must at least rebel, overpower and chastise the mother (Compare Adam and Lilith, above) The 'overpowering" signifies incestuous rape[103] Herodotus[104] has preserved for us a valuable fragment of this religious phantasy

"And how they celebrate their feast to Isis in the city of Busiris, I have already previously remarked After the sacrifice, all of them, men and women, full ten thousand people, begin to beat each other. But it would be sin for me to mention for whom they do beat each other

But in Papremis they celebrated the sacrifice with holy actions, as in the other places About the time when the sun sets, some few priests are busy around the image, most of them stand at the entrance with wooden clubs, and others who would fulfil a vow, more than a thousand men, also stand in a group with wooden cudgels opposite them

Now on the eve of the festival, they take the image out in a small and gilded temple into another sacred edifice Then the few who remain with the image draw a four wheeled chariot upon which the temple stands with the image which it encloses But the others who stand in the anterooms are not allowed to enter Those under a vow, who stand by the god, beat them off Now occurs a furious battle with clubs, in which they bruise each other's bodies and as I believe, many even die from their wounds notwithstanding this, the Egyptians consider that none die

"The natives claim that the festival gathering was introduced for the following reason in this sanctuary lived the mother of Ares[105] Now Ares was brought up abroad and when he became a man he came to have *intercourse*

with his mother The servants of his mother who had seen him did not allow him to enter peacefully, but prevented him, at which he fetched people from another city, who mistreated the servants and had entrance to his mother Therefore, they asserted that this slaughter was introduced at the *feast for Ares* "

It is evident that the pious here fight their way to a share in the mystery of the raping of the mother [106] This is the part which belongs to them,[107] while the heroic deed belongs to the god [108] By Ares is meant the Egyptian Typhon, as we have good reasons to suppose. *Thus Typhon represents the evil longing for the mother* with which other myth forms reproach the mother, according to the well-known example The death of Balder, quite analogous to the death of Osiris (attack of sickness of Rê), because of the wounding by the branch of the mistletoe, seems to need a similar explanation. It is recounted in the myth how all creatures were pledged not to hurt Balder, save only the mistletoe, which was forgotten, presumably because it was too young This killed Balder Mistletoe is a parasite The female piece of wood in the fire-boring ritual was obtained [109] from the wood of a parasitical or creeping plant, the fire mother. The " mare " rests upon " Marentak," in which Grimm suspects the mistletoe The mistletoe was a remedy against barrenness In Gaul the Druid alone was allowed to climb the holy oak amid solemn ceremonies after the completed sacrifice, in order to cut off the ritual mistletoe.[110] This act is a religiously limited and organised incest. That which grows on the tree is the child,[111] which man might have by the mother ; then man himself would be in a renewed and rejuvenated form ; and precisely this is what man cannot have, because the incest prohibition forbids it As the Celtic custom shows, the act is performed by the priest only, with the observation of certain ceremonies , the hero god and the redeemer of the world, however, do the unpermitted, the superhuman thing, and through it purchase immortality The dragon, who must be overcome for this purpose, means, as must have been for some time clearly seen, the resistance against the incest Dragon and serpent, especially with the characteristic accumulation of anxiety attributes, are the symbolic representations of anxiety which correspond to the repressed incest wish It is, therefore, intelligible, when we come across the tree with the snake again and again (in Paradise the snake even tempts to sin) The snake or dragon possesses in particular the meaning of treasure guardian and defender. The phallic, as well as the feminine, meaning of the dragon [112] indicates that it is again a symbol of the sexual neutral (or bisexual) libido, that is to say, a symbol of the *libido in opposition*. In this significance the black horse, Apaosha, the demon of opposition, appears in the old Persian song, Tishtriya, where it obstructs the sources of the rain lake The white horse Tishtriya makes two futile attempts to vanquish Apaosha , at the third attempt, with the help of Ahuramazda, he is successful.[113] Whereupon the sluices



BULL-SACRIFICE OF MITHRA

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of heaven open and a fruitful rain pours down upon the earth.[114] In this song one sees very beautifully in the choice of symbol how libido is opposed to libido, will against will, the discordance of primitive man with himself, which he recognises again in all the adversity and contrasts of external nature.

The symbol of the tree encoiled by the serpent may also be translated as the mother defended from incest by resistance. This symbol is by no means rare upon Mithraic monuments. The rock encircled by a snake is to be comprehended similarly, because Mithra is one born from a rock. The menace of the new-born by the snake (Mithra, Hercules) is made clear through the legend of Lilith and Lamia. Python, the dragon of Leto, and Poine, who devastates the land of Crotopus, are sent by the father of the new-born. This idea indicates the localisation, well known in psychoanalysis, of the incest anxiety in the father. The father represents the active repulse of the incest wish of the son. The crime, unconsciously wished for by the son, is imputed to the father under the guise of a pretended murderous purpose, this being the cause of the mortal fear of the son for the father, a frequent neurotic symptom. In conformity with this idea, the monster to be overcome by the young hero is frequently a giant, the guardian of the treasure or the woman. A striking example is the giant Chumbaba in the Gilgamesh epic, who protected the garden of Ishtar;[115] he is overcome by Gilgamesh, whereby Ishtar is won. Thereupon she makes erotic advances towards Gilgamesh.[116] This data should be sufficient to render intelligible the rôle of Horus in Plutarch, especially the violent usage of Isis. Through overpowering the mother the hero becomes equal to the sun; he reproduces himself. He wins the strength of the invincible sun, the power of eternal rejuvenation. We thus understand a series of representations from the Mithraic myth on the Heddernheim relief. There we see, first of all, the birth of Mithra from the top of the tree; the next representation shows him carrying the conquered bull (comparable to the monstrous bull overcome by Gilgamesh). This bull signifies the concentrated significance of the monster, the father, who as giant and dangerous animal embodies the incest prohibition, and agrees with the individual libido of the sun-hero, which he overcomes by self-sacrifice. The third picture represents Mithra, when he grasps the head ornament of the sun, the nimbus. This act recalls to us, first of all, the violence of Horus towards Isis; secondly, the Christian basic thought, *that those who have overcome attain the crown of eternal life.* On the fourth picture Sol kneels before Mithra. These last two representations show plainly that Mithra has taken to himself the strength of the sun, so that he becomes the lord of the sun as well. He has conquered "his animal nature," the bull. The animal knows no incest prohibition; man, is therefore, man because he conquers the incest wish, that is, the animal nature. Thus Mithra has sacrificed his animal nature, the incest wish, and with that has

overcome the mother, that is to say, "the terrible death-bringing mother" A solution is already anticipated in the Gilgamesh epic through the formal renunciation of the horrible Ishtar by the hero The overcoming of the mother in the Mithraic sacrifice, which had almost an ascetic character, took place no longer by the archaic [illegible] through the renunciation, the sacrifice of the [illegible] thought of incestuous reproduction through entrance into the mother's womb had already been displaced, because man was so far advanced in domestication that he believed that the eternal life of the sun is reached, not through the perpetration of incest, but through the sacrifice of the incest wish This important change expressed in the Mithraic mystery finds its full expression for the first time in the symbol of the crucified God A bleeding human sacrifice was hung on the tree of life for Adam's sins [117] The first-born sacrifices its life to the mother when he suffers, hanging on the branch, a disgraceful and painful death, a mode of death which belongs to the most ignominious forms of execution, which Roman antiquity had reserved for only the lowest criminal Thus the hero dies, as if he had committed the most shameful crime, he does this by returning into the birth-giving branch of the tree of life, at the same time paying for his guilt with the pangs of death The animal nature is repressed most powerfully in this deed of the highest courage and the greatest renunciation, therefore, a greater salvation is to be expected for humanity, because such a deed alone seems appropriate to expiate Adam's guilt

As has already been mentioned, the hanging of the sacrifice on the tree is a generally widespread ritual custom, Germanic examples being especially abundant The ritual consists in the sacrifice being pierced by a spear.[118] Thus it is said of Odin (Edda, Havamal).

> "I know that I hung on the windswept tree
> Nine nights through,
> Wounded by a spear, dedicated to Odin
> I myself to myself"

The hanging of the sacrifice to the cross also occurred in America prior to its discovery. Muller [119] mentions the Fejervaryian manuscript (a Mexican hieroglyphic kodex), at the conclusion of which there is a colossal cross, in the middle of which there hangs a bleeding divinity Equally interesting is the cross of Palenque, [120] up above is a bird, on either side two human figures, who look at the cross and hold a child against it either for sacrifice or baptism The old Mexicans are said to have invoked the favor of Centeotls, "the daughter of heaven and the goddess of wheat," every spring by nailing upon the cross a youth or a maiden and by shooting the sacrifice with arrows [121] The name of the Mexican cross signifies "tree of our life or flesh" [122]

An effigy from the Island of Philae represents Osiris in the form of a crucified god, wept over by Isis and Nephthys, the sister consort [123]

The meaning of the cross is certainly not limited to the tree of life, as has already been shown Just as the tree of life has also a phallic sub-meaning (as libido symbol), so there is a further significance to the cross than life and immortality [124] Muller uses it as a sign of rain and of fertility, because it appears among the Indians distinctly as a magic charm of fertility It goes without saying, therefore, that it plays a rôle in the sun cult It is also noteworthy that the sign of the cross is an important sign for the keeping away of all evil, like the ancient gesture of Manofica The phallic amulets also serve the same purpose Zockler appears to have overlooked the fact that the phallic Crux Ansata is the same cross which has flourished in countless examples in the soil of antiquity Copies of this Crux Ansata are found in many places, and almost every collection of antiquities possesses one or more specimens [125]

Finally, it must be mentioned that the form of the human body is imitated in the cross as of a man with arms outspread It is remarkable that in early Christian representations Christ is not nailed to the cross, but stands before it with arms outstretched [126] Maurice [127] gives a striking basis for this interpretation when he says

> " It is a fact not less remarkable than well attested, that the Druids in their groves were accustomed to select the most stately and beautiful tree as an emblem of the deity they adored, and cutting off the side branches, they affixed two of the largest of them to the highest part of the trunk, in such a manner that those branches extended on each side like the arms of a man, and together with the body presented the appearance of a huge cross, and in the bark in several places was also inscribed the latter T (tau) " [128]

" The tree of knowledge " of the Hindoo Dschaina sect assumes human form , it was represented as a mighty, thick trunk in the form of a human head, from the top of which grew out two longer branches hanging down at the sides and one short, vertical, uprising branch crowned by a bud or blossom-like thickening [129] Robertson in his " Evangelical Myths " mentions that in the Assyrian system there exists the representation of the divinity in the form of a cross, in which the vertical beam corresponds to a human form and the horizontal beam to a pair of conventionalised wings Old Grecian idols such, for example, as were found in large numbers in Aegina have a similar character, an immoderately long head and arms slightly raised, wing-shaped, and in front distinct breasts [130]

I must leave it an open question as to whether the symbol of the cross has any relation to the two pieces of wood in the religious fire production, as is frequently claimed It does appear, however, as if the cross symbol actually still possessed the significance of " union " for this idea belongs to the fertility charm, and especially to the thought of eternal rebirth, which is most intimately bound up with the cross The thought of " union," expressed by the

symbol of the cross, is met with in "Timaios" of Plato, where the world soul is conceived as stretched out between heaven and earth in the form of an X (Chi), hence in the form of a "St Andrew's cross." When we now learn, furthermore, that the world soul contains in itself *the world as a body*, then this picture inevitably reminds us of the mother.

(*Dialogues of Plato* Jowett, Vol II, page 528.)

"And in the center he put the soul, which he diffused through the whole, and also spread over all the body round about and he made one solitary and only heaven, a circle moving in a circle having such excellence as to be able to hold converse with itself, and needing no other friendship or acquaintance Having these purposes in view he created the world to be a blessed god."

This highest degree of inactivity and freedom from desire, symbolised by the *being enclosed within itself*, signifies divine blessedness. The only human prototype of this conception is the child in the mother's womb, or rather more, the adult man in the continuous embrace of the mother, from whom he originates. Corresponding to this mythologic-philosophic conception, the enviable Diogenes inhabited a tub, thus giving mythologic expression to the blessedness and resemblance to the Divine in his freedom from desire. Plato says as follows of the bond of the world soul to the world body:

"Now God did not make the soul after the body, although we have spoken of them in this order, for when he put them together he would never have allowed that the elder should serve the younger, but this is what we say at random, because we ourselves too are very largely affected by chance. Whereas he made the soul in origin and excellence prior to and older than the body, to the ruler and mistress, of whom the body was to be the subject."

It seems conceivable from other indications that the conception of the soul in general is a derivative of the mother-imago, that is to say, a symbolic designation for the amount of libido remaining in the mother-imago. (Compare the Christian representation of the soul as the bride of Christ.) The further development of the world soul in "Timaios" takes place in an obscure fashion in mystic numerals. When the mixture was completed the following occurred:

"This entire compound he divided lengthways into two parts, which he joined to one another at the center like the figure of an X."

This passage approaches very closely the division and union of Atman, who, after the division, is compared to a man and a woman who hold each other in an embrace. Another passage is worth mentioning:

"After the entire union of the soul had taken place, according to the master's mind, he formed all that is corporeal within this, and joined it together so as to penetrate it throughout."

Moreover, I refer to my remarks about the maternal meaning of the world soul in Plotinus in Chapter II.

A similar detachment of the symbol of the cross from a concrete

figure we find among the Muskhogean Indians, who stretch above the surface of the water (pond or stream) two ropes crosswise and at the point of intersection throw into the water fruits, oil and precious stones as a sacrifice [131] Here the divinity is evidently the water, not the cross, which designates the place of sacrifice only, through the point of intersection The sacrifice at the place of union indicates why this symbol was a primitive charm of fertility,[132] why we meet it so frequently in the prechristian era among the goddesses of love (mother goddesses), especially among the Egyptians in Isis and the sun-god We have already discussed the continuous union of these two divinities As the cross (Tau [T], Crux Ansata) always recurs in the hand of Tum, the supreme God, the hegemon of the Ennead, it may not be superfluous to say something more of the destination of Tum The Tum of On-Heliopolis bears the name "the father of his mother", what that means needs no explanation, Jusas or Nebit-Hotpet, the goddess joined to him, *was called sometimes the mother, sometimes the daughter, sometimes the wife of the god* The day of the beginning of autumn is designated in the Heliopolitan inscriptions as the "festival of the goddess Jusasit," as "the arrival of the sister for the purpose of uniting with her father," It is the day in which "the goddess Mehnit completes her work, so that the god Osiris may enter into the left eye" (By which the moon is meant [133]) The day is also called the filling up of the sacred eye with its needs The heavenly cow with the moon eye, the cow-headed Isis, takes to herself in the autumn equinox the seed which procreates Horus. (Moon as keeper of the seed) The "eye" evidently represents the genitals, as in the myth of Indra, who had to bear spread over his whole body the likeness of Yoni (vulva), on account of a Bathsheba outrage, but was so far pardoned by the gods that the disgraceful likeness of Yoni was changed into eyes [134] The "pupil" in the eye is a child The great god becomes a child again, he enters the mother's womb in order to renew himself [135] In a hymn it is said

> "Thy mother, the heavens, stretches forth her arms to thee"

In another place it is said

> "Thou shinest, oh father of the gods, upon the back of thy mother, daily thy mother takes thee in her arms When thou illuminatest the dwelling of night, thou unitest with thy mother, the heavens" [136]

The Tum of Pitum-Heliopolis not only bears the Crux Ansata as a symbol, but also has this sign as his most frequent surname, that is, ān^{χ} or ān^{χ}i, which means "life" or "the living" He is chiefly honoured as the demon serpent, Agatho, of whom it is said, "The holy demon serpent Agatho goes forth from the city Nezi" The snake, on account of casting its skin, is the symbol of renewal, as is the scarabæus, a symbol of the sun, of whom it is said that he, being of masculine sex only, reproduces himself

The name Chnum (another name for Tum, always meaning "the sun-god") comes from the verb χnum, which means "to bind together, to unite."[137] Chnum appears chiefly as the potter, the moulder of his egg. The cross seems, therefore, to be an extraordinarily condensed symbol; its supreme meaning is that of the tree of life, and, therefore, is a symbol of the mother. The symbolisation in a human form is, therefore, intelligible. The phallic forms of the Crux Ansata belong to the abstract meaning of "life" and "fertility," as well as to the meaning of "union," which we can now very properly interpret as *cohabitation with the mother for the purpose of renewal*.[138] It is, therefore, not only a very touching but also a very significant naïve symbolism when Mary, in an Old English lament of the Virgin,[139] accuses the cross of being a false tree, which unjustly and without reason destroyed "the pure fruit of her body, her gentle birdling" with a poisonous draught, the draught of death, which is destined only for the guilty descendants of the sinner Adam. Her son was not a sharer in that guilt. (Compare with this the cunning of Isis with the fatal draught of love.) Mary laments:

"Cross, thou art the evil stepmother of my son, so high hast thou hung him that I cannot even kiss his feet! Cross, thou art my mortal enemy, thou hast slain my little blue bird!"

The holy cross answers:

"Woman, I thank thee for my honour: thy splendid fruit, which now I bear shines as a red blossom.[140] Not alone to save thee but to save the whole world this precious flower blooms in thee."[141]

Santa Crux says of the relation to each other of the two mothers (Isis in the morning and Isis in the evening):

"Thou hast been crowned as Queen of Heaven on account of the child, which thou hast borne. But I shall appear as the shining relic to the whole world, at the day of judgment. I shall then raise my lament for thy divine son innocently slain upon me."

Thus the murderous mother of death unites with the mother of life in bringing forth a child. In their lament for the dying God, and as outward token of their union, Mary kisses the cross and is reconciled to it.[142] The naïve Egyptian antiquity has preserved for us the union of the contrasting tendencies in the mother idea of Isis. Naturally this imago is merely a symbol of the libido of the son for the mother, and describes the conflict between love and incest resistance. The criminal incestuous purpose of the son appears projected as criminal cunning in the mother-imago. The separation of the son from the mother signifies the separation of man from the generic consciousness of animals, from that infantile archaic thought characterised by the absence of individual consciousness.

It was only the power of the incest prohibition which created the

self-conscious individual, who formerly had been thoughtlessly one with the tribe, and in this way alone did the idea of individual and final death become possible Thus through the sin of Adam death came into the world This, as is evident, is expressed figuratively, that is, in contrast form The mother's defence against the incest appears to the son as a malicious act, which delivers him over to the fear of death This conflict faces us in the Gilgamesh epic in its original freshness and passion, where also the incest wish is projected on to the mother

The neurotic who cannot leave the mother has good reasons, the fear of death holds him there It seems as if no idea and no word were strong enough to express the meaning of this Entire religions were constructed in order to give words to the immensity of this conflict This struggle for expression which continued down through the centuries certainly cannot have its source in the restricted realm of the vulgar conception of incest Rather one must understand the law which is ultimately expressed as " Incest prohibition " as coercion to domestication, and consider the religious systems as institutions which first receive, then organise and gradually sublimate, the motor forces of the animal nature not immediately available for cultural purposes

We will now return to the visions of Miss Miller Those now following need no further detailed discussion The next vision is the image of a " purple bay " The symbolism of the sea connects smoothly with that which precedes One might think here in addition of the reminiscences of the Bay of Naples, which we came across in Part I In the consequence of the whole, however, we must not overlook the significance of the " bay " In French it is called *une baie*, which probably corresponds to a bay in the English text It might be worth while here to glance at the etymological side of this idea. Bay is generally used for something which is open, just as the Catalonian word *badia* (*bai*) comes from *badar*, " to open " In French *bayer* means " to have the mouth open, to gape." Another word for the same is *Meerbusen*, " bay or gulf " ; Latin *sinus*, and a third word is golf (gulf), which in French stands in closest relation to *gouffre*=abyss Golf is derived from " κόλπος," [143] which also means " bosom " and " womb," " mother-womb " also " vagina " It can also mean a fold of a dress or pocket, it may also mean a deep valley between high mountains These expressions clearly show what primitive ideas lie at their base They render intelligible Goethe's choice of words at that place where Faust wishes to follow the sun with winged desire in order in the everlasting day " to drink its eternal light " ,

> " The mountain chain with all its gorges deep,
> Would then no more impede my godlike motion
> And now before mine eyes expands the ocean,
> With all its bays, in shining sleep ! "

Faust's desire, like that of every hero, inclines towards the mysteries of rebirth, of immortality; therefore, his course leads to the sea, and down into the monstrous jaws of death, the horror and narrowness of which at the same time signify the new day.

> "Out on the open ocean speeds my dreaming
> The glassy flood before my feet is gleaming,
> A new day beckons to a newer shore!
> A fiery chariot borne on buoyant pinions,
> Sweeps near me now! I soon shall ready be
> To pierce the ether's high, unknown dominions,
> To reach spheres of pure activity!
> This Godlike rapture, this supreme existence . .
>
> . .
>
> "Yes, let me dare those gates to fling asunder,
> Which every man would fain go slinking by!
> 'Tis time, through deeds this word of truth to thunder,
> That with the height of God Man's dignity may vie!
> Nor from that gloomy gulf to shrink affrighted,
> Where fancy doth herself to self-born pangs compel,—
> To struggle toward that pass benighted,
> Around whose narrow mouth flame all the fires of Hell,—
> To take this step with cheerful resolution,
> Though Nothingness should be the certain swift conclusion!"

It sounds like a confirmation, when the succeeding vision of Miss Miller's is *une falaise à pic*, "a steep, precipitous cliff." (Compare *gouffre*.) The entire series of individual visions is completed, as the author observes, by a confusion of sounds, somewhat resembling "wa-ma, wa-ma." This has a very primitive, barbaric sound. Since we learn from the author nothing of the subjective roots of this sound, nothing is left us but the suspicion that this sound might be considered, taken in connection with the whole, as a slight mutilation of the well-known call ma-ma.

CHAPTER VI

THE BATTLE FOR DELIVERANCE FROM THE MOTHER

There now comes a pause in the production of visions by Miss Miller; then the activity of the unconscious is resumed very energetically.

A forest with trees and bushes appears.

After the discussions in the preceding chapter, there is need only of a hint that the symbol of the forest coincides essentially with the meaning of the holy tree. The holy tree is found generally in a sacred forest inclosure or in the garden of Paradise. The sacred grove often takes the place of the taboo tree and assumes all the attributes of the latter. The erotic symbolism of the garden is generally known. The forest, like the tree, has mythologically a maternal significance. In the vision which now follows, the forest furnishes the stage upon which the dramatic representation of the end of Chiwantopel is played. This act, therefore, takes place in or near the mother.

First, I will give the beginning of the drama as it is in the original text, up to the first attempt at sacrifice. At the beginning of the next chapter the reader will find the continuation, the monologue and the sacrificial scene. The drama begins as follows:

"The personage Chiwantopel, came from the south, on horse-back; around him a cloak of vivid colors, red, blue and white. An Indian in a costume of doe skin, covered with beads and ornamented with feathers advances, squats down and prepares to let fly an arrow at Chiwantopel. The latter presents his breast in an attitude of defiance, and the Indian, fascinated by that sight, slinks away and disappears within the forest."

The hero, Chiwantopel, appears on horseback. This fact seems of importance, because as the further course of the drama shows (see Chapter VIII) the horse plays no indifferent rôle, but suffers the same death as the hero, and is even called "faithful brother" by the latter. These allusions point to a remarkable similarity between horse and rider. There seems to exist an intimate connection between the two, which guides them to the same destiny. We already have seen that the symbolisation of "the libido in resistance" through the "terrible mother" in some places runs parallel with the horse.[1] Strictly speaking, it would be incorrect to say that the horse is, or means, the mother. The mother idea is a libido symbol, and the horse is also a libido symbol, and at some points the two symbols intersect in their significances. The common feature of the two ideas lies in the libido, especially in the

libido repressed from incest The hero and the horse appear to us in this setting like an artistic formation of the idea of humanity with its repressed libido, whereby the horse acquires the significance of the animal unconscious, which appears domesticated and subjected to the will of man Agni upon the ram, Wotan upon Sleipneir, Ahuramazda upon Angromainyu,[2] Jahwe upon the monstrous seraph, Christ upon the ass,[3] Dionysus upon the ass, Mithra upon the horse, Men upon the human-footed horse, Freir upon the golden-bristled boar, etc , are parallel representations The chargers of mythology are always invested with great significance , they very often appear anthropomorphised Thus, Men's horse has human forelegs , Balaam's ass, human speech , the retreating bull, upon whose back Mithra springs in order to strike him down, is, according to a Persian legend, actually the God himself The mock crucifix of the Palatine represents the crucified with an ass's head, perhaps in reference to the ancient legend that in the temple of Jerusalem the image of an ass was worshipped As Drosselbart (horse's mane) Wotan is half-human, half-horse[4] An old German riddle very prettily shows this unity between horse and horseman[5] "Who are the two, who travel to Thing ? Together they have three eyes, ten feet[6] and one tail , and thus they travel over the land " Legends ascribe properties to the horse, which psychologically belong to the unconscious of man , horses are clairvoyant and clairaudient , they show the way when the lost wanderer is helpless ; they have mantic powers In the Iliad the horse prophesies evil The hear the words which the corpse speaks when it is taken to the grave—words which men cannot hear Cæsar learned from his human-footed horse (probably taken from the identification of Cæsar with the Phyrgian Men) that he was to conquer the world An ass prophesied to Augustus the victory of Actium The horse also sees phantoms All these things correspond to typical manifestations of the unconscious. Therefore, it is perfectly intelligible that the horse, as the image of the wicked animal component of man, has manifold connections with the devil The devil has a horse's foot , in certain circumstances a horse's form At crucial moments he suddenly shows a cloven foot (proverbial) in the same way as in the abduction of Hadding, Sleipneir suddenly looked out from behind Wotan's mantle[7] Just as the nightmare rides on the sleeper, so does the devil, and, therefore, it is said that those who have nightmares are ridden by the devil In Persian lore the devil is the steed of God. The devil, like all evil things, represents sexuality Witches have intercourse with him, in which case he appears in the form of a goat or horse The unmistakably phallic nature of the devil is communicated to the horse as well , hence this symbol occurs in connections where this is the only meaning which would furnish an explanation It is to be mentioned that Loki generates in the form of a horse, just as does the devil when in horse's form, as an old fire god Thus the lightning was represented theriomorphically

as a horse.[8] An uneducated hysteric told me that as a child she had suffered from extreme fear of thunder, because every time the lightning flashed she saw immediately afterwards a huge black horse reaching upwards as far as the sky.[9] It is said in a legend that the devil, as the divinity of lightning, casts a horse's foot (lightning) upon the roofs. In accordance with the primitive meaning of thunder as fertiliser of the earth, the phallic meaning is given both to lightning and the horse's foot. In mythology the horse's foot really has the phallic function as in this dream. An uneducated patient who originally had been violently forced to coitus by her husband very often dreams (after separation) that a wild horse springs upon her and kicks her in the abdomen with his hind foot. Plutarch has given us the following words of a prayer from the Dionysus orgies:

ἐλθεῖν ἥρως Διόνυσε Ἄλιον ἐς ναὸν ἁγνὸν σὺν Χαρίτεσσιν ἐς ναὸν τῷ βοέῳ ποδὶ θύων, ἄξιε ταῦρε, ἄξιε ταῦρε * [10]

Pegasus with his foot strikes out of the earth the spring Hippocrene. Upon a Corinthian statue of Bellerophon, which was also a fountain, the water flowed out from the horse's hoof. Balder's horse gave rise to a spring through his kick. Thus the horse's foot is the dispenser of fruitful moisture." A legend of lower Austria, told by Jaehns, informs us that a gigantic man on a white horse is sometimes seen riding over the mountains. This means a speedy rain. In the German legend the goddess of birth, Frau Holle, appears on horseback. Pregnant women near confinement are prone to give oats to a white horse from their aprons and to pray him to give them a speedy delivery. It was originally the custom for the horse to rub against the woman's genitals. The horse (like the ass) had in general the significance of a priapic animal.[12] Horse's tracks are idols dispensing blessing and fertility. Horse's tracks established a claim, and were of significance in determining boundaries, like the priaps of Latin antiquity. Like the phallic Dactyli, a horse opened the mineral riches of the Harz Mountains with his hoof. The horseshoe, an equivalent for horse's foot,[13] brings luck and has apotropaic meaning. In the Netherlands an entire horse's foot is hung up in the stable to ward against sorcery. The analogous effect of the phallus is well known; hence the phalli at the gates. In particular the horse's leg turned lightning aside, according to the principle "similia similibus."

Horses also symbolise the wind, that is to say, the tertium comparationis is again the libido symbol. The German legend recognises the wind as the wild huntsman in pursuit of the maiden. Stormy regions frequently derive their names from horses, as the White Horse Mountain of the Luneburger heath. The centaurs are

* Come O Dionysus, in thy temple of Elis, come with the Graces into thy holy temple; come in sacred frenzy with the bull's foot.

typical wind gods, and have been represented as such by Böcklin's artistic intuition [14]

Horses also signify fire and light The fiery horses of Helios are an example The horses of Hector are called Xanthos (yellow, bright), Podargos (swift-footed), Lampos (shining) and Aithon (burning) A very pronounced fire symbolism was represented by the mystic Quadriga, mentioned by Dio Chrysostomus The supreme God always drives his chariot in a circle Four horses are harnessed to the chariot. The horse driven on the periphery moves very quickly He has a shining coat, and bears upon it the signs of the planets and the Zodiac [15] This is a representation of the rotary fire of heaven The second horse moves more slowly, and is illuminated only on one side The third moves still more slowly, and the fourth rotates around himself But once the outer horse set the second horse on fire with his fiery breath, and the third flooded the fourth with his streaming sweat Then the horses dissolve and pass over into the substance of the strongest and most fiery, which now becomes the charioteer The horses also represent the four elements The catastrophe signifies the conflagration of the world and the deluge, whereupon the division of the God into many parts ceases, and the divine unity is restored [16] Doubtless the Quadriga may be understood astronomically as a *symbol of time* We already saw in the first part that the stoic representation of Fate is a fire symbol It is, therefore, a logical continuation of the thought, when time, closely related to the conception of destiny, exhibits this same libido symbolism Brihâdaranyaka-Upanishad, 1 · 1, says

> "The morning glow verily is the head of the sacrificial horse, the sun his eye, the wind his breath, the all-spreading fire his mouth, the year is the belly of the sacrificial horse The sky is his back, the atmosphere the cavern of his body, the earth the vault of his belly The poles are his sides, in between the poles his ribs, the seasons his limbs, the months and fortnights his joints Days and nights are his feet, stars his bones, clouds his flesh The food he digests is the deserts, the rivers are his veins, the mountains his liver and lungs, the herbs and trees his hair, the rising sun is his fore part, the setting sun his after part The ocean is his kinsman, the sea his cradle"

The horse undoubtedly here stands for a time symbol, and also for the entire world We come across in the Mithraic religion, a strange God of Time, Aion, called Kronos or Deus Leontocephalus, because his stereotyped representation is a lion-headed man, who, standing in a rigid attitude, is encoiled by a snake whose head projects forward from behind over the lion's head. The figure holds in each hand a key, on the chest rests a thunderbolt, upon his back are the four wings of the wind, in addition to that, the figure sometimes bears the Zodiac on his body Additional attributes are a cock and implements In the Carolingian psalter of Utrecht, which is based upon ancient models, the Sæculum-Aion is represented as a naked man with a snake in his hand As is suggested by the

name of the divinity, he is a symbol of time, most interestingly composed from libido symbols. The lion, the zodiac sign of the greatest summer heat,[17] is the symbol of the most mighty desire ("my soul roars with the voice of a hungry lion," says Mechthild of Magdeburg). In the Mithra mystery the serpent is often antagonistic to the lion, corresponding to that very universal myth of the battle of the sun with the dragon.

In the Egyptian Book of the Dead, Tum is even designated as a he-cat, because as such he fought the snake, Apophis. The encoiling also means the engulfing, the entering into the mother's womb. Thus time is defined by the rising and setting of the sun, that is to say, through the death and renewal of the libido. The addition of the cock again suggests time, and the addition of implements suggests the creation through time. ("Durée créatrice," Bergson.) Oromazdes and Ahriman were produced through Zrwanakarana, the "infinitely long duration." Time, this empty and purely formal concept, is expressed in the mysteries by transformations of the creative power, the libido. Macrobius says:

"Leonis capite monstratur praesens tempus—quia conditio ejus valida fervensque est."*

Philo of Alexandria has a better understanding:

"Tempus ab hominibus pessimis putatur deus, volentibus Ens essentiale abscondere—pravis hominibus tempus putatur causa rerum mundi, sapientibus vero et optimis non tempus sed Deus." †[18]

In Firdusi[19] time is often the symbol of fate, the libido nature of which we have already learned to recognise. The Hindoo text mentioned above includes still more—its symbol of the horse contains the whole world; his kinsman and his cradle is the sea, the mother, similar to the world soul, the maternal significance of which we have seen above. Just as Aion represents the libido in an embrace, that is to say, in the state of death and of rebirth, so here the cradle of the horse is the sea, *i.e.*, the libido is in the mother, dying and rising again, like the symbol of the dying and resurrected Christ, who hangs like ripe fruit upon the tree of life.

We have already seen that the horse is connected through Ygdrasil with the symbolism of the tree. The horse is also a "tree of death"; thus in the Middle Ages the funeral pyre was called St. Michael's horse, and the neo-Persian word for coffin means "wooden horse."[20] The horse has also the rôle of psycho-pompos; he is the steed to conduct the souls to the other world—horse-women fetch the souls (Valkyries). Neo-Greek songs represent Charon on a horse. These

* The present time is indicated by the head of the lion—because his condition is strong and impetuous.

† Time is thought by the wickedest people to be a divinity who deprives willing people of essential being; by good men it is considered to be the Cause of the things of the world, but to the wisest and best it does not seem time, but God.

definitions obviously lead to the mother symbolism. The Trojan horse was the only means by which the city could be conquered, because only he who has entered the mother and been reborn is an invincible hero. The Trojan horse is a magic charm, like the "Nodfyr," which also serves to overcome necessity. The formula evidently reads, "In order to overcome the difficulty, thou must commit incest, and once more be born from thy mother." It appears that striking a nail into the sacred tree signifies something very similar. The "Stock im Eisen" in Vienna seems to have been such a palladium.

Still another symbolic form is to be considered. Occasionally the devil rides upon a three-legged horse. The Goddess of Death, Hel, in time of pestilence, also rides upon a three-legged horse.[21] The gigantic ass, which is three legged, stands in the heavenly rain lake Vourukasha; his urine purifies the water of the lake, and from his roar all useful animals become pregnant and all harmful animals miscarry. The Triad further points to the phallic significance. The contrasting symbolism of Hel is blended into one conception in the ass of Vourukasha. The libido is fructifying as well as destroying.

These definitions, as a whole, plainly reveal the fundamental features. The horse is a libido symbol, partly of phallic, partly of maternal significance, like the tree. It represents the libido in this application, that is, the libido repressed through the incest prohibition.

In the Miller drama an Indian approaches the hero, ready to shoot an arrow at him. Chiwantopel, however, with a proud gesture, exposes his breast to the enemy. This idea reminds the author of the scene between Cassius and Brutus in Shakespeare's "Julius Cæsar." A misunderstanding has arisen between the two friends, when Brutus reproaches Cassius for withholding from him the money for the legions. Cassius, irritable and angry, breaks out into the complaint:

> "Come, Antony, and young Octavius, come,
> Revenge yourselves alone on Cassius,
> For Cassius is a-weary of the world:
> Hated by one he loves; braved by his brother;
> Check'd like a bondman; *all his faults observed*,
> Set in a note book, learn'd and conn'd by rote,
> To cast into my teeth. O I could weep
> My spirit from mine eyes!—There is my dagger,
> And here my naked breast; within, a heart
> Dearer than Plutus' mine, richer than gold:
> If that thou be'st a Roman, take it forth;
> I, that denied thee gold, will give my heart:
> Strike, as thou didst at Cæsar; for I know
> When thou didst hate him worst, thou lov'dst him better
> Than ever thou lov'dst Cassius."

The material here would be incomplete without mentioning the fact that this speech of Cassius shows many analogies to the agonised

delirium of Cyrano (compare Part I), only Cassius is far more theatrical and overdrawn. Something childish and hysterical is in his manner. Brutus does not think of killing him, but administers a very chilling rebuke in the following dialogue:

BRUTUS. Sheathe your dagger:
Be angry when you will, it shall have scope;
Do what you will, dishonor shall be humor.
O Cassius, you are yoked with a lamb
That carries anger as the flint bears fire;
Who, much enforced, shows a hasty spark,
And straight is cold again.

CASSIUS. Hath Cassius lived
To be but mirth and laughter to his Brutus,
When grief and blood ill-tempered vexeth him?

BRUTUS. When I spoke that, I was ill-tempered too.

CASSIUS. Do you confess so much? Give me your hand.

BRUTUS. And my heart, too.

CASSIUS. O Brutus!

BRUTUS. What's the matter?

CASSIUS. Have not you love enough to bear with me,
When that rash humor *which my mother gave me*
Makes me forgetful?

BRUTUS. Yes, Cassius, and from henceforth
When you are over earnest with your Brutus,
He'll think your mother chides and leave you so.

The analtyic interpretation of Cassius's irritability plainly reveals that at these moments he identifies himself with the mother, and his conduct, therefore, is truly feminine, as his speech demonstrates most excellently. For his womanish love-seeking and desperate subjection under the proud masculine will of Brutus calls forth the friendly remark of the latter, that Cassius is yoked with a lamb, that is to say, has something very weak in his character, which is derived from the mother. One recognises in this without any difficulty the analytic hall-marks of an infantile disposition, which, as always, is characterised by a prevalence of the parent-imago, here the mother-imago. An infantile individual is infantile because he has freed himself insufficiently, or not at all, from the childish environment, that is, from his adaptation to his parents. Therefore, on one side, he reacts falsely towards the world, as a child towards his parents, always demanding love and immediate reward for his feelings; on the other side, on account of the close connection to the parents, he identifies himself with them. The infantile individual behaves like the father and mother. He is not in a condition to live for himself and to find the place to which he belongs. Therefore, Brutus very justly takes it for granted that the "mother chides" in Cassius, not he himself. The psychologically valuable fact which

we gather here is the information *that Cassius is infantile and identified with the mother* The hysterical behaviour is due to the circumstance that Cassius is still, in part, a lamb, and *an innocent and entirely harmless child* He remains, as far as his emotional life is concerned, still far behind himself This we often see among people who, as masters, apparently govern life and fellow creatures, they have remained children in regard to the demands of their love nature

The figures of the Miller dramas, being children of the creator's phantasy, depict, as is natural, those traits of character which belong to the author The hero, the wish figure, is represented as most distinguished, because the hero always combines in himself all wished-for ideals Cyrano's attitude is certainly beautiful and impressive, Cassius's behavior has a theatrical effect Both heroes prepare to die effectively, in which attempt Cyrano succeeds This attitude betrays a wish for death in the unconscious of our author, the meaning of which we have already discussed at length as the motive for her poem of the moth The wish of young girls to die is only an indirect expression, which remains a pose, even in case of real death, for death itself can be a pose Such an outcome merely adds beauty and value to the pose under certain conditions That the highest summit of life is expressed through the symbolism of death is a well-known fact, for creation beyond one's self means personal death The coming generation is the end of the preceding one This symbolism is frequent in erotic speech The lascivious speech between Lucius and the wanton servant-maid in Apuleius (" Metamorphoses," lib ii 32) is one of the clearest examples

" Proeliare, inquit, et fortiter proeliare nec enim tibi cedam, nec terga vortam Cominus in aspectum, si vir es, dirige, et grassare naviter, et occide moriturus Hodierna pugna non habet missionem —Simul ambo corruimus inter mutuos amplexus animas anhelantes " *

This symbolism is extremely significant, because it shows how easily a contrasting expression originates and how equally intelligible and characteristic such an expression is The proud gesture with which the hero offers himself to death may very easily be an indirect expression which challenges the pity or sympathy of the other, and thus is doomed to the calm analytic reduction to which Brutus proceeds The behavior of Chiwantopel is also suspicious, because the Cassius scene which serves as its model betrays indiscreetly that the whole affair is merely infantile and one which owes its origin to an overactive mother imago When we compare this piece with the series of mother symbols brought to light in the previous chapter, we must say that the Cassius scene merely confirms

* " Fight," she said, " and fight bravely, for I will not give away an inch nor turn my back Face to face, come on if you are a man ! Strike home, do your worst and die ! The battle this day is without quarter . till, weary in body and mind, we lie powerless and gasping for breath in each other's arms "

once more what we have long supposed, that is to say, that the motor power of these symbolic visions arises from an infantile mother transference, that is to say, from an undetached bond to the mother.

In the drama the libido, in contradistinction to the inactive nature of the previous symbols, assumes a threatening activity, a conflict becoming evident, in which the one part threatens the other with murder. The hero, as the ideal image of the dreamer, is inclined to die; he does not fear death. In accordance with the infantile character of this hero, it would most surely be time for him to take his departure from the stage, or, in childish language, to die. Death is to come to him in the form of an arrow-wound. Considering the fact that heroes themselves are very often great archers or succumb to an arrow-wound (St. Sebastian, as an example), it may not be superfluous to inquire into the meaning of death through an arrow.

We read in the biography of the stigmatised nun Katherine Emmerich[22] the following description of the evidently neurotic sickness of her heart:

> "When only in her novitiate, she received as a Christmas present from the holy Christ a very tormenting heart trouble for the whole period of her nun's life. God showed her inwardly the purpose; it was on account of the decline of the spirit of the order, especially for the sins of her fellow-sisters. But what rendered this trouble most painful was the gift which she had possessed from youth, namely, to see before her eyes the inner nature of man as he really was. She felt the heart trouble physically as if her heart was continually pierced by arrows.[23] These arrows—and this represented the still worse mental suffering—she recognized as the thoughts, plots, secret speeches, misunderstandings, scandal and uncharitableness, in which her fellow-sisters, wholly without reason and unscrupulously, were engaged against her and her god-fearing way of life."

It is difficult to be a saint, because even a patient and long-suffering nature will not readily bear such a violation, and defends itself in its own way. The companion of sanctity is temptation, without which no true saint can live. We know from analytic experience that these temptations can pass unconsciously, so that only their equivalents would be produced in consciousness in the form of symptoms. We know that it is proverbial that heart and smart (Herz and Schmerz) rhyme. It is a well-known fact that hysterics put a physical pain in place of a mental pain. The biographer of Emmerich has comprehended that very correctly. Only her interpretation of the pain is, as usual, projected. It is always the others who secretly assert all sorts of evil things about her, and this she pretended gave her the pains.[24] The case, however, bears a somewhat different aspect. The very difficult renunciation of all life's joys, this death before the bloom, is generally painful, and especially painful are the unfulfilled wishes and the attempts of the animal nature to break through the power of repression. The gossip and jokes of the sisters very naturally centre around these most painful things, so that it must appear to the saint as if her symptoms were caused by this. Naturally, again,

she could not know that gossip tends to assume the rôle of the unconscious, which, like a clever adversary, always aims at the actual gaps in our armour.

A passage from Gautama Buddha embodies this idea:[25]

> "A wish earnestly desired
> Produced by will, and nourished
> When gradually it must be thwarted,
> Burrows like an arrow in the flesh."

The wounding and painful arrows do not come from without through gossip, which only attacks externally, but they come from ambush, from our own unconscious. This, rather than anything external, creates the defenseless suffering. It is our *own repressed and unrecognised desires which fester like arrows in our flesh*.[26] In another connection this was clear to the nun, and that most literally. It is a well-known fact, and one which needs no further proof to those who understand, that these mystic scenes of union with the Saviour generally are intermingled with an enormous amount of sexual libido.[27] Therefore, it is not astonishing that the scene of the stigmata is nothing but an incubation through the Saviour, only slightly changed metaphorically, as compared with the ancient conception of "unio mystica," as cohabitation with the god. Emmerich relates the following of her stigmatisation:

> "I had a contemplation of the sufferings of Christ, and implored him to let me feel with him his sorrows, and prayed five paternosters to the honor of the five sacred wounds. Lying on my bed with outstretched arms, I entered into a great sweetness and into an endless thirst for the torments of Jesus. Then I saw a light descending upon me: it came obliquely from above. It was a crucified body, living and transparent, with arms extended, but without a cross. The wounds shone brighter than the body; they were five circles of glory, coming forth from the whole glory. I was enraptured and my heart was moved with great pain and yet with sweetness from longing to share in the torments of my Saviour. And my longings for the sorrows of the Redeemer increased more and more on gazing on his wounds, and passed from my breast, through my hands, sides and feet to his holy wounds: then from the hands, then from the sides, then from the feet of the figure threefold shining red beams ending below in an arrow, shot forth to my hands, sides and feet."

The beams, in accordance with the phallic fundamental thought, are threefold, terminating below in an arrowpoint.[28] Like Cupid, the sun, too, has its quiver, full of destroying or fertilising arrows, sun rays,[29] which possess phallic meaning. On this significance evidently rests the Oriental custom of designating brave sons as arrows and javelins of the parents. "To make sharp arrows" is an Arabian expression for "to generate brave sons." The Psalms declare (cxxvii. 4):

> "Like as the arrows in the hands of the giant, even so are the young children."

(Compare with this the remarks previously made about "boys.") Because of this significance of the arrow it is intelligible why the

Scythian king Ariantes, when he wished to prepare a census, demanded an arrow-head from each man. A similar meaning attaches equally to the lance. Men are descended from the lance, because the ash is the *mother of lances*. Therefore, *the men of the Iron Age* are derived from her. The marriage custom to which Ovid alludes ("Comat virgineas hasta recurva comas"—*Fastorum*, lib. ii. 560) has already been mentioned. Kaineus issued a command that his lance be honored. Pindar relates in the legend of this Kaineus:

"He descended into the depths, splitting the earth with a straight foot."[59]

He is said to have originally been a maiden named Kainis, who, because of her complaisance, was transformed into an invulnerable man by Poseidon. Ovid pictures the battle of the Lapithæ with the invulnerable Kaineus; how at last they covered him completely with trees, because they could not otherwise touch him. Ovid says at this place:

> "Exitus in dubio est: alii sub inania corpus
> Tartara detrusum *silvarum mole ferebant*,
> Abnuit Ampycides: medioque ex aggere fulvis
> Vidit avem pennis liquidas exire sub auras." *

Roscher considers this bird to be the golden plover (Charadrius pluvialis), which borrows its name from the fact that it lives in the *χαραδρα*, a crevice in the earth. By his song he proclaims the approaching rain. Kaineus was changed into this bird.

We see again in this little myth the typical constituents of the libido myth: original bisexuality, immortality (invulnerability) through entrance into the mother (splitting the mother with the foot, and to become covered up) and resurrection as a bird of the soul and a bringer of fertility (ascending sun). When this type of hero causes his lance to be worshipped, it probably means that his lance is a valid and equivalent expression of himself.

From our present standpoint, we understand in a new sense that passage in Job, which I mentioned in Chapter IV of the first part of this book:

"He has set me up for his mark.

"His archers compass me round about, he cleaveth my reins asunder, and doth not spare;—he poureth out my gall upon the ground.

"He breaketh me with breach upon breach; he runneth upon me like a giant."—*Job* xvi: 12-13-14.

Now we understand this symbolism as an expression for the soul torment caused by the onslaught of the unconscious desires. The libido festers in his flesh, a cruel god has taken possession of him and pierced him with his painful libidian projectiles, with thoughts, which overwhelmingly pass through him. (As a dementia præcox

* The result is doubtful: the body borne down by the weight of the forest is carried into empty Tartaros. Ampycides denies this: from out of the midst of the mass, he sees a bird with tawny feathers issue into the liquid air.

patient once said to me during his recovery. "To-day a thought suddenly thrust itself through me.") This same idea is found again in Nietzsche in Zarathustra

The Magician

Stretched out, shivering
Like one half dead whose feet are warmed,
Shaken alas! by unknown fevers,
Trembling from the icy pointed arrows of frost,
Hunted by Thee, O Thought!
Unutterable! Veiled! Horrible One!
Thou huntsman behind the clouds!
Struck to the ground by thee,
Thou mocking eye that gazeth at me from the dark
———— Thus do I lie
Bending, writhing, tortured
With all eternal tortures,
Smitten
By thee, cruelest huntsman,
Thou unfamiliar God

Smite deeper!
Smite once more.
Pierce through and rend my heart!
What meaneth this torturing
With blunt-toothed arrows
Why gazeth thou again,
Never weary of human pain,
With malicious, God-lightning eyes,
Thou wilt not kill,
But torture, torture?

No long-drawn-out explanation is necessary to enable us to recognise in this comparison the old, universal idea of the martyred sacrifice of God, which we have met previously in the Mexican sacrifice of the cross and in the sacrifice of Odin [81] This same conception faces us in the oft-repeated martyrdom of St Sebastian, where, in the delicate-glowing flesh of the young god, all the pain of renunciation which has been felt by the artist has been portrayed An artist always embodies in his artistic work a portion of the mysteries of his time. In a heightened degree the same is true of the principal Christian symbol, the crucified one pierced by the lance, the conception of the man of the Christian era tormented by his wishes, crucified and dying in Christ

This is not torment which comes from without, which befalls mankind, but that he himself is the hunter, murderer, sacrificer and sacrificial knife is shown us in another of Nietzsche's poems, wherein the apparent dualism is transformed into the soul conflict through the use of the same symbolism:

"Oh, Zarathustra,
Most cruel Nimrod!
Whilom hunter of God
The snare of all virtue,
An arrow of evil!

Now
Hunted by thyself
Thine own prey
Pierced through thyself,
Now
Alone with thee
Twofold in thine own knowledge
'Mid a hundred mirrors
False to thyself,
'Mid a hundred memories
Uncertain
Ailing with each wound
Shivering with each frost
Caught in thine own snares,
Self knower!
Self hangman!

" Why didst thou strangle thyself
With the noose of thy wisdom?
Why hast thou enticed thyself
Into the Paradise of the old serpent?
Why hast thou crept
Into thyself, thyself? . . ."

The deadly arrows do not strike the hero from without, but it is he himself who, in disharmony with himself hunts, fights and tortures himself Within himself will has turned against will, libido against libido—therefore, the poet says, " Pierced through thyself," that is to say, wounded by his own arrow Because we have discerned that the arrow is a libido symbol, the idea of " penetrating or piercing through " consequently becomes clear to us It is a phallic act of union with one's self, a sort of self-fertilisation (introversion), also a self-violation, a self-murder, therefore, Zarathustra may call himself his own hangman, like Odin, who sacrifices himself to Odin

The wounding by one's own arrow means, first of all, *the state of introversion* What this signifies we already know—the libido sinks into its " own depths " (a well-known comparison of Nietzsche's) and finds there below, in the shadows of the unconscious, the substitute for the upper world, which it has abandoned, *the world of memories* (" 'mid a hundred memories "), the strongest and most influential of which are the early infantile memory pictures It is the world of the child, this paradise-like state of earliest childhood, from which we are separated by a hard law In this subterranean kingdom slumber sweet feelings of home and the endless hopes of all that is to be As Heinrich in the " Sunken Bell," by Gerhart Hauptmann, says, in speaking of his miraculous work.

" There is a song lost and forgotten,
A song of home, a love song of childhood,
Brought up from the depths of the fairy well,
Known to all, but yet unheard "

However, as Mephistopheles says, " The danger is great " These depths are enticing; they are the mother and—death When the

libido leaves the bright upper world, whether from the decision of the individual or from decreasing life force, then it sinks back into its own depths, into the source from which it has gushed forth, and turns back to that point of cleavage, the umbilicus, through which it once entered into this body. This point of cleavage is called the mother, because from her comes the source of the libido. Therefore, when some great work is to be accomplished, before which weak man recoils, doubtful of his strength, his libido returns to that source—and this is the dangerous moment, in which the decision takes place between annihilation and new life. If the libido remains arrested in the wonder kingdom of the inner world,[32] then the man has become for the world above a phantom, then he is practically dead or desperately ill.[33] But if the libido succeeds in tearing itself loose and pushing up into the world above, then a miracle appears. This journey to the underworld has been a fountain of youth, and new fertility springs from his apparent death. This train of thought is very beautifully gathered into a Hindoo myth: Once upon a time, Vishnu sank into an ecstasy (introversion) and during this state of sleep bore Brahma, who, enthroned upon the lotus flower, arose from the navel of Vishnu, bringing with him the Vedas, which he diligently read. (Birth of creative thought from introversion.) But through Vishnu's ecstasy a devouring flood came upon the world. (Devouring through introversion, symbolising the danger of entering into the mother of death.) A demon taking advantage of the danger, stole the Vedas from Brahma and hid them in the depths. (Devouring of the libido.) Brahma roused Vishnu, and the latter, transforming himself into a fish, plunged into the flood, fought with the demon (battle with the dragon), conquered him and recaptured the Vedas. (Treasure obtained with difficulty.)

Self-concentration and the strength derived therefrom correspond to this primitive train of thought. It also explains numerous sacrificial and magic rites which we have already fully discussed. Thus the impregnable Troy falls because the besiegers creep into the belly of a wooden horse; for he alone is a hero who is reborn from the mother, like the sun. But the danger of this venture is shown by the history of Philoctetes, who was the only one in the Trojan expedition who knew the hidden sanctuary of Chryse, where the Argonauts had sacrificed already, and where the Greeks planned to sacrifice in order to assure a safe ending to their undertaking. Chryse was a nymph upon the island of Chryse; according to the account of the scholiasts in Sophocles's "Philoctetes," this nymph loved Philoctetes, and cursed him because he spurned her love. This characteristic projection, which is also met with in the Gilgamesh epic, should be referred back, as suggested, to the repressed incest wish of the son, who is represented through the projection as if the mother had the evil wish, for the refusal of which the son

was given over to death In reality, however, the son becomes mortal by separating himself from the mother His fear of death, therefore, corresponds to the repressed wish to turn back to the mother, and causes him to believe that the mother threatens or pursues him The teleological significance of this *fear of persecution* is evident, *it is to keep son and mother apart*

The curse of Chryse is realised in so far that Philoctetes, according to one version, when approaching his altar, injured himself in his foot with one of his own deadly poisonous arrows, or, according to another version [34] (this is better and far more abundantly proven), *was bitten in his foot by a poisonous serpent* [35] From then on he is ailing [36]

This very typical wound, which also destroyed Rê, is described in the following manner in an Egyptian hymn :

"The ancient of the Gods moved his mouth,
He cast his saliva upon the earth,
And what he spit, fell upon the ground
With her hands Isis kneaded that and the soil
Which was about it, together
From that she created a venerable worm,
And made him like a spear
She did not twist him living around her face,
But threw him coiled upon the path
Upon which the great God wandered at ease
Through all his lands

"The venerable God stepped forth radiantly,
The gods who served Pharaoh acompanied him,
And he proceeded as every day
Then the venerable worm stung him . .
The divine God opened his mouth
And the voice of his majesty echoed even to the sky.
And the gods exclaimed Behold !
Thereupon he could not answer,
His jaws chattered,
All his limbs trembled
And the poison gripped his flesh,
As the Nile seizes upon the land."

In this hymn Egypt has again preserved for us a primitive conception of the serpent's sting The aging of the autumn sun as an image of human senility is symbolically traced back to the mother through the poisoning by the serpent The mother is reproached, because her malice causes the death of the sun-god The serpent, the primitive symbol of fear,[37] illustrates the repressed tendency to turn back to the mother, because the only possibility of security from death is possessed by the mother, as the source of life

Accordingly, only the mother can cure him, sick unto death, and, therefore, the hymn goes on to depict how the gods were assembled to take counsel

"And Isis came with her wisdom
Her mouth is full of the breath of life,
Her words banish sorrow,
And her speech animates those who no longer breathe
She said 'What is that what is that, divine father?
Behold, a worm has brought you sorrow——

"'Tell me thy name, divine father,
Because the man remains alive, who is called by his name'"

Whereupon Rê replied

"'I am he, who created heaven and earth, and piled up the hills,
And created all beings thereon
I am he, who made the water and caused the great flood,
Who produced the bull of his mother,
Who is the procreator,' etc

"The poison did not depart, it went further,
The great God was not cured
Then said Isis to Rê
'Thine is not the name thou hast told me
Tell me true that the poison may leave thee,
For he whose name is spoken will live'"

Finally Rê decides to speak his true name He is approximately healed (imperfect composition of Osiris); but he has lost his power, and finally he retreats to the heavenly cow.

The poisonous worm is, if one may speak in this way, a "negative" phallus, a deadly, not an animating, form of libido, therefore, a wish for death, instead of a wish for life The "true name" is soul and magic power, hence a symbol of libido What Isis demands is the retransference of the libido to the mother goddess This request is fulfilled literally, for the aged god turns back to the divine cow, the symbol of the mother.[38] This symbolism is clear from our previous explanations The onward urging, living libido which rules the consciousness of the son, demands separation from the mother. The longing of the child for the mother is a hindrance on the path to this, taking the form of a psychologic resistance, which is expressed empirically in the neurosis by all manners of fears, that is to say, the fear of life The more a person withdraws from adaptation to reality, and falls into slothful inactivity, the greater becomes his anxiety (cum grano salis), which everywhere besets him at each point as a hindrance upon his path The fear springs from the mother, that is to say, from the longing to go back to the mother, which is opposed to the adaptation to reality. This is the way in which the mother has become apparently the malicious pursuer. Naturally, it is not the actual mother, although the actual mother, with the abnormal tenderness with which she sometimes pursues her child, even into adult years, may gravely injure it through a wilful prolonging of the infantile state in the child It is rather the mother imago, which becomes the Lamia The mother-imago, however, possesses its power solely and exclusively from the son's tendency not only to look and to

work forwards, but also to glance backwards to the pampering sweetness of childhood, to that glorious state of irresponsibility and security with which the protecting mother once surrounded him.[39]

The retrospective longing acts like a paralyzing poison upon the energy and enterprise; so that it may well be compared to a poisonous serpent which lies across our path. Apparently, it is a hostile demon which robs us of energy, but, in reality, it is the individual unconscious, the retrogressive tendency of which begins to overcome the conscious forward striving. The cause of this can be, for example, the natural aging which weakens the energy, or it may be great external difficulties, which cause man to break down and become a child again, or it may be, and this is probably the most frequent cause, the woman who enslaves the man, so that he can no longer free himself, and becomes a child again.[40] It may be of significance also that Isis, as sister-wife of the sun-god, creates the poisonous animal from the spittle of the god, which is perhaps a substitute for sperma, and, therefore, is a symbol of libido. She creates the animal from the libido of the god; that means she receives his power, making him weak and dependent, so that by this means she assumes the dominating rôle of the mother. (Mother transference to the wife.) This part is preserved in the legend of Samson, in the rôle of Delilah, who cut off Samson's hair, the sun's rays, thus robbing him of his strength.[41] Any weakening of the adult man strengthens the wishes of the unconscious; therefore, the decrease of strength appears directly as the backward striving towards the mother.

There is still to be considered one more source of the reanimation of the mother-imago. We have already met it in the discussion of the mother scene in "Faust," that is to say, *the willed introversion of a creative mind*, which, retreating before its own problem and inwardly collecting its forces, dips at least for a moment into the source of life, in order there to wrest a little more strength from the mother for the completion of its work. It is a mother-child play with one's self, in which lies much weak self-admiration and self adulation ("Among a hundred mirrors"—Nietzsche); *a Narcissus state*, a strange spectacle, perhaps, for profane eyes. The separation from the mother-imago, the birth out of one's self, reconciles all conflicts through the sufferings. This is probably meant by Nietzsche's verse:

"Why hast thou enticed thyself
Into the Paradise of the old serpent?
Why hast thou crept
Into thyself, thyself? . . .

"A sick man now,
Sick of a serpent's poison;[42]
A captive now

Whom the hardest destiny befell
In thine own pit,
Bowed down as thou workest
Encaved within thyself,
Burrowing into thyself,
Helpless,
Stiff,
A corpse
Overwhelmed with a hundred burdens,
Overburdened by thyself
A wise man,
A self-knower,
The wise Zarathustra,
Thou soughtest the heaviest burden
And foundest thou thyself . "

The symbolism of this speech is of the greatest richness He is buried in the depths of *self, as if in the earth*, really a dead man who has turned back to mother earth; [43] a Kaineus " piled with a hundred burdens " and pressed down to death, the one who groaning bears the heavy burden of his own libido, of that libido which draws him back to the mother Who does not think of the Taurophoria of Mithra, who took his bull (according to the Egyptian hymn, " the bull of his mother "), that is, his love for his mother, the heaviest burden upon his back, and with that entered upon the painful course of the so-called Transitus! [44] This path of passion led to the *cave*, in which the bull was sacrificed Christ, too, had to bear the cross,[45] the symbol of his love for the mother, and he carried it to the place of sacrifice where the lamb was slain in the form of the God, the infantile man, a "self-executioner," and then to burial in the subterranean sepulchre [46]

That which in Nietzsche appears as a poetical figure of speech is really a primitive myth It is as if the poet still possessed a dim idea or capacity to feel and reactivate those imperishable phantoms of long-past worlds of thought in the words of our present-day speech and in the images which crowd themselves into his phantasy Hauptmann also says. " Poetic rendering is that which allows the echo of the primitive word to resound through the form " [47]

The sacrifice, with its mysterious and manifold meaning, which is rather hinted at than expressed, passes unrecognised in the unconscious of our author The arrow is not shot, the hero Chiwantopel is not yet fatally poisoned and ready for death through self-sacrifice We now can say, according to the preceding material, this sacrifice means renouncing the mother, that is to say, *renunciation of all bonds and limitations which the soul has taken with it from the period of childhood into the adult life* From various hints of Miss Miller's it appears that at the time of these phantasies she was still living in the circle of the family, evidently at an age which was in urgent need of independence That is to say, man does not live very long in the infantile environment or in the bosom of his family

without real danger to his mental health. Fate calls him forth to independence, and he who gives no heed to this hard call because of childish indolence and fear is threatened by a neurosis, and once the neurosis has broken out it becomes more and more a valid reason to escape the battle with life and to remain for all time in the morally poisoned infantile atmosphere.

The phantasy of the arrow-wound belongs in this struggle for personal independence. The thought of this resolution has not yet penetrated the dreamer. On the contrary, she rather repudiates it. After all the preceding, it is evident that the symbolism of the arrow-wound through direct translation must be taken as a coitus symbol. The "Occide moriturus" attains by this means the sexual significance belonging to it. Chiwantopel naturally represents the dreamer. But nothing is attained and nothing is understood through one's reduction to the coarse sexual, because it is a commonplace that the unconscious shelters coitus wishes, the discovery of which signifies nothing futher. *The coitus wish under this aspect is really a symbol for the individual demonstration of the libido separated from the parents, of the conquest of an independent life.* This step towards a new life means, at the same time, the death of the past life.[48] Therefore, Chiwantopel is the infantile hero[49] (the son, the child, the lamb, the fish) who is still enchained by the fetters of childhood and who has to die as a symbol of the incestuous libido, and with that sever the retrogressive bond. For the entire libido is demanded for the battle of life, and there can be no remaining behind. The dreamer cannot yet come to this decision, which will tear aside all the sentimental connections with father and mother, and yet it must be made in order to follow the call of the individual destiny.

CHAPTER VII

THE DUAL MOTHER RÔLE

AFTER the disappearance of the assailant, Chiwantopel begins the following monologue.

> "From the extreme ends of these continents, from the farthest lowlands, after having forsaken the palace of my father, I have been wandering aimlessly during a hundred moons, always pursued by my mad desire to find 'her who will understand.' With jewels I have tempted many fair ones, with kisses I have tried to snatch the secret of their hearts, with acts of bravery I have conquered their admiration (He reviews the women he has known) Chita, the princess of my race she is a little fool, vain as a peacock, having nought in her head but jewels and perfume Ia-nan, the young peasant, bah, a mere sow, no more than a breast and a stomach, caring only for pleasure And then Ki-ma, the priestess, a true parrot, repeating hollow phrases learnt from the priests, all for show, without real education or sincerity, suspicious poseur and hypocrite! Alas! Not one who understands me, not one who resembles me, not one who has a soul sister to mine There is not one among them all who has known my soul, not one who could read my thought, far from it, not one capable of seeking with me the luminous summits, or of spelling with me the superhuman word, love"

Here Chiwantopel himself says that his journeying and wandering is a quest for that other, and for the meaning of life which lies in union with her In the first part of this work we merely hinted gently at this possibility The fact that the seeker is masculine and the sought-for of feminine sex is not so astonishing, because the chief object of the unconscious transference is the mother, as has probably been seen from that which we have already learned. The daughter takes a male attitude towards the mother The genesis of this adjustment can only be suspected in our case, because objective proof is lacking Therefore, let us rather be satisfied with inferences "She who will understand" means the mother, in the infantile language At the same time, it also means the life companion As is well known, the sex contrast concerns the libido but little The sex of the object plays a surprisingly slight rôle in the estimation of the unconscious The object itself, taken as an objective reality, is but of slight significance (But it is of greatest importance whether the libido is transferred or introverted) The original concrete meaning of *erfassen*, "to seize," *begreifen*, "to touch," etc, allows us to recognise clearly the underside of the wish —to find a congenial person But the "upper" intellectual half is also contained in it, and is to be taken into account at the same

time. One might be inclined to assume this tendency if it were not that our culture abused the same, for the misunderstood woman has become almost proverbial, which can only be the result of a wholly distorted valuation. On the one side, our culture undervalues most extraordinarily the importance of sexuality; on the other side, sexuality breaks out as a direct result of the repression burdening it at every place where it does not belong, and makes use of such an indirect manner of expression that one may expect to meet it suddenly almost anywhere. Thus the idea of the intimate comprehension of a human soul, which is in reality something very beautiful and pure, is soiled and disagreeably distorted through the entrance of the indirect sexual meaning.[1] The secondary meaning or, better expressed, the misuse, which repressed and demonized sexuality forces upon the highest soul functions, makes it possible, for example, for certain of our opponents to scent in psychoanalysis prurient erotic confessionals. These are subjective wish-fulfilment delusions which need no contra arguments. This misuse makes the wish to be "understood" highly suspicious, if the natural demands of life have not been fulfilled. Nature has *first claim* on man; only long afterwards does the luxury of intellect come. The mediæval ideal of life for the sake of death needs gradually to be replaced by a natural conception of life, in which the normal demands of men are thoroughly kept in mind, so that the desires of the animal sphere may no longer be compelled to drag down into their service the high gifts of the intellectual sphere in order to find an outlet. We are inclined, therefore, to consider the dreamer's wish for understanding, first of all, as a repressed striving towards the natural destiny. This meaning coincides absolutely with psychoanalytic experience, that there are countless neurotic people who apparently are prevented from experiencing life because they have an unconscious and often also a conscious repugnance to the sexual fate, under which they imagine all kinds of ugly things. There is only too great an inclination to yield to this pressure of the unconscious sexuality and to experience the dreaded (unconsciously hoped for) disagreeable sexual experience, so as to acquire by that means a legitimately founded horror which retains them more surely in the infantile situation. This is the reason why so many people fall into that very state towards which they have the greatest abhorrence.

That we were correct in our assumption that, in Miss Miller, it is a question of the battle for independence is shown by her statement that the hero's departure from his father's house reminds her of the fate of the young Buddha, who likewise renounced all luxury to which he was born in order to go out into the world to live out his destiny to its completion. Buddha gave the same heroic example as did Christ, who separated from his mother, and even spoke bitter words (Matthew, chap. x, v. 34):

"Think not that I am come to send peace on earth. I came not to send peace, but a sword.

(35) "For I am come to set a man at variance against his father, and the daughter against her mother, and the daughter-in law against her mother-in-law

(36) "And a man's foes shall be they of his own household

(37) "He that loveth father or mother more than me is not worthy of me"

Or Luke, chap xii, v. 51:

"Suppose ye that I am come to give peace on earth? I tell you, Nay but rather division

(52) "For from henceforth there shall be five in one house divided, three against two, and two against three

(53) "The father shall be divided against the son, and the son against the father, the mother against the daughter, and the daughter against the mother, the mother in law against the daughter-in-law, and the daughter-in-law against her mother-in-law"

Horus snatched from his mother her head adornment, the power Just as Adam struggled with Lilith, so he struggles for power Nietzsche, in "Human, All Too Human," expressed the same in very beautiful words

"One may suppose that a mind, in which the 'type of free mind' is to ripen and sweeten at maturity, has had its decisive crisis in a great detachment, so that before this time it was just so much the more a fettered spirit and appeared chained forever to its corner and its pillar[2] What binds it most firmly? What cords are almost untearable? Among human beings of a high and exquisite type, it would be duties that reverence, which is suitable for youth, that modesty and tenderness for all the old honored and valued things, that thankfulness for the earth from which they grew, for the hand which guided them, for the shrine where they learnt to pray —their loftiest moments themselves come to bind them the firmest, to obligate them the most permanently The great detachment comes suddenly for people so bound

"'Better to die than to live here'—thus rings the imperative voice of seduction and this here, this 'at home' is all, that it (the soul) has loved until now! A sudden terror and suspicion against that which it has loved, a lightning flash of scorn towards that which is called 'duty,' a rebellious, arbitrary, volcanic, impelling desire for travelling, for strange countries, estrangements, coolness, frigidity, disillusionments, a hatred of love, perhaps a sacrilegious touch and glance backwards[3] there where just now it adored and loved, perhaps a blush of shame over what it has just done, and at the same time an exultation over having done it, an intoxicating internal joyous thrill, in which a victory reveals itself—a victory? Over what? Over whom? An enigmatic, doubtful, questioning victory, but the first triumph Of such woe and pain is formed the history of the great detachment It is like a disease which can destroy men,—this first eruption of strength and will towards self-assertion"[4]

The danger lies, as is brilliantly expressed by Nietzsche, in isolation in one's self

"Solitude surrounds and embraces him ever more threatening, ever more constricting, ever more heart strangling, the terrible Goddess and Mater sæva cupidinum"

The libido taken away from the mother, who is abandoned only reluctantly, becomes threatening as a serpent, the symbol of death, for the relation to the mother must cease, *must die, which itself almost*

causes man's death In " Mater sæva cupidinum " the idea attains rare, almost conscious, perfection

I do not presume to try to paint in better words than has Nietzsche the psychology of the wrench from childhood

Miss Miller furnishes us with a further reference to a material which has influenced her creation in a more general manner, this is the great Indian epic of Longfellow, " The Song of Hiawatha "

If my readers have had patience to read thus far, and to reflect upon what they have read, they frequently must have wondered at the number of times I introduce for comparison such apparently foreign material and how often I widen the base upon which Miss Miller's creations rest Doubts must often have arisen whether it is justifiable to enter into important discussions concerning the psychologic foundations of myths, religions and culture in general on the basis of such scanty suggestions. It might be said that behind the Miller phantasies such a thing is scarcely to be found I need hardly emphasise the fact that I, too, have sometimes been in doubt I had never read " Hiawatha " until, in the course of my work, I came to this part " Hiawatha," a poetical compilation of Indian myths, gives me, however, a justification for all preceding reflections, because this epic contains an unusual number of mythologic problems This fact is probably of great importance for the wealth of suggestions in the Miller phantasies We are, therefore, compelled to obtain an insight into this epic

Nawadaha sings the songs of the epic of the hero Hiawatha, the friend of man

> " There he sang of Hiawatha
> Sang the songs of Hiawatha
> Sang his wondrous birth and being,
> How he prayed and how he fasted,
> How he lived and toiled and suffered,
> That the tribes of men might prosper,
> That he might advance his people "

The teleological meaning of the hero, as that symbolic figure which unites in itself libido in the form of admiration and adoration, in order to lead to higher sublimations by way of the symbolic bridges of the myths, is anticipated here Thus we become quickly acquainted with Hiawatha as a savior, and are prepared to hear all that which must be said of a savior, of his marvellous birth, of his early great deeds, and his sacrifice for his fellow-men

The first song begins with a fragment of evangelism. Gitche Manito, the " master of life," tired of the quarrels of his human children, calls his people together and makes known to them the joyous message

> " I will send a prophet to you,
> A Deliverer of the nations,
> Who shall guide you and shall teach you,
> Who shall toil and suffer with you

> If you listen to his counsels,
> You will multiply and prosper,
> If his warnings pass unheeded,
> You will fade away and perish!"

Gitche Manito, the Mighty, "the creator of the nations," is represented as he stood erect "on the great Red Pipestone quarry":

> "From his footprints flowed a river,
> Leaped into the light of morning,
> O'er the precipice plunging downward
> Gleamed like Ishkoodah, the comet."

The water flowing from his footsteps sufficiently proves the phallic nature of this creator. I refer to the earlier utterances concerning the phallic and fertilising nature of the horse's foot and the horse's steps, and especially do I recall Hippocrene and the foot of Pegasus.[5] We meet with the same idea in Psalm lxv, vv. 9 to 11:

> "Thou visitest the earth, and waterest it; thou makest it very plenteous.
> "The river of God is full of water; thou preparest their corn, for so thou providest for the earth.
> "Thou waterest her furrows; thou sendest rain into the little valleys thereof; thou makest it soft with the drops of rain, and blessest the increase of it.
> "Thou crownest the year with thy goodness; and thy paths drop fatness."

Wherever the fertilising God steps, there is fruitfulness. We already have spoken of the symbolic meaning of treading in discussing the nightmares. Kaineus passes into the depths, "splitting the earth with a foot outstretched." Amphiaraus, another chthonic hero, sinks into the earth, which Zeus has opened for him by a stroke of lightning. (Compare with that the above-mentioned vision of a hysterical patient, who saw a black horse after a flash of lightning: identity of horse's footstep and flash of lightning.) By means of a flash of lightning heroes were made immortal.[6] Faust attained the mothers when he stamped his foot:

> "Stamp and descend, stamping thou'lt rise again."

The heroes in the sun-devouring myths often stamp at or struggle in the jaws of the monster. Thus Tor stamped through the ship's bottom in battle with the monster, and *went as far as the bottom of the sea*. (Kaineus.) (Concerning "kicking" as an infantile phantasy, see above.) The regression of the libido to the presexual stage makes this preparatory action of treading either a substitution for the coitus phantasy or for the phantasy of re-entrance into the mother's womb. The comparison of water flowing from the footsteps with a comet is a light symbolism for the fructifying moisture (sperma). According to an observation by Humboldt (Kosmos), certain South American Indian tribes call the meteors "urine of the stars." Mention is also made of how Gitche Manito makes fire. He blows upon a forest, so that the trees, rubbing upon each other, burst into flame. This demon is, therefore, an excellent libido symbol; he also produced fire.

After this prologue in the second song, the hero's previous history is related. The great warrior, Mudjekeewis (Hiawatha's father), has cunningly overcome the great bear, "the terror of the nations," and stolen from him the magic "belt of wampum," a girdle of shells. Here we meet the motive of the "treasure attained with difficulty," which the hero rescues from the monster. Who the bear is, is shown by the poet's comparisons. Mudjekeewis strikes the bear on his head after he has robbed him of the treasure:

> "With the heavy blow bewildered
> Rose the great Bear of the mountains,
> But his knees beneath him trembled,
> And he whimpered *like a woman*."

Mudjekeewis said derisively to him:

> "Else you would not cry and whimper,
> Like a *miserable woman*!
>
> But you, Bear! sit here and whimper,
> And disgrace your tribe by crying,
> Like a wretched Shaugodaya,
> Like a *cowardly old woman*!"

These three comparisons with a woman are to be found near each other on the same page. Mudjekeewis has, like a true hero, once more torn life from the jaws of death, from the all-devouring "terrible mother." This deed, which, as we have seen, is also represented as a journey to hell, "night journey through the sea," the conquering of the monster from within, signifies at the same time entrance into the mother's womb, a rebirth, the results of which are perceptible also for Mudjekeewis. As in the Zosimos vision, here too the entering one becomes the breath of the wind or spirit. Mudjekeewis becomes the west wind, the fertilising breath, the father of winds.[7] His sons become the other winds. An intermezzo tells of them and of their love stories, of which I will mention only the courtship of Wabuns, the East Wind, because here the erotic wooing of the wind is pictured in an especially beautiful manner. Every morning he sees a beautiful girl in a meadow, whom he eagerly courts:

> "Every morning, gazing earthward,
> Still the first thing he beheld there
> Was her blue eyes looking at him,
> Two blue lakes among the rushes."

The comparison with water is not a matter of secondary importance, because "from wind and water" shall man be born anew.

> "And he wooed her with caresses,
> Wooed her with his smile of sunshine,
> With his flattering words he wooed her,
> With his sighing and his singing,
> Gentlest whispers in the branches,
> Softest music, sweetest odors," etc.

In these onamatopoetic verses the wind's caressing courtship is excellently expressed.[8]

The third song presents the previous history of Hiawatha's mother. His grandmother, when a maiden, lived in the moon. There she once swung upon a liana, but a jealous lover cut off the liana, and Nokomis, Hiawatha's grandmother, fell to earth. The people, who saw her fall downwards, thought that she was a *shooting star*. This marvellous descent of Nokomis is more plainly illustrated by a later passage of this same song; there little Hiawatha asks the grandmother what is the moon. Nokomis teaches him about it as follows. The moon is the body of a *grandmother*, whom a warlike grandson has cast up there in wrath. Hence the moon is the *grandmother*. In ancient beliefs, the moon is also the gathering place of departed souls,[9] the guardian of seeds; therefore, once more a place of the origin of life of predominantly feminine significance. The remarkable thing is that Nokomis, falling upon the earth, gave birth to a daughter, Wenonah, subsequently the mother of Hiawatha. The throwing upwards of the mother, and her falling down and bringing forth, seems to contain something typical in itself. Thus a story of the seventeenth century relates that a mad bull threw a pregnant woman as high as a house, and tore open her womb, and the child fell without harm upon the earth. On account of his wonderful birth, this child was considered a hero or doer of miracles, but he died at an early age. The belief is widespread among lower savages that the sun is feminine and the moon masculine. Among the Namaqua, a Hottentot tribe, the opinion is prevalent that the sun consists of transparent bacon.

"The people, who journey on boats, draw it down by magic every evening, cut off a suitable piece and then give it *a kick so that it flies up again into the sky.*"—*Waitz*. "Anthropologie," II, 342.

The infantile nourishment comes from the mother. In the Gnostic phantasies we come across a legend of the origin of man which possibly belongs here: the female archons bound to the vault of Heaven are unable, on account of its quick rotation, to keep their young within them, but let them fall upon the earth, from which men arise. Possibly there is here a connection with barbaric midwifery, the letting fall of the parturient. The assault upon the mother is already introduced with the adventure of Mudjekeewis, and is continued in the violent handling of the "grandmother," Nokomis, who, as a result of the cutting of the liana and the fall downwards, seems in some way to have become pregnant. The "cutting of the branch," the plucking, we have already recognised as mother incest. (See above.) That well-known verse, "Saxonland, where beautiful maidens grow upon trees," and phrases like "picking cherries in a neighbour's garden," allude to a similar idea. The fall downwards of Nokomis deserves to be compared to a poetical figure in Heine:

"A star, a star is falling
Out of the glittering sky!
The star of Love! I watch her
Sink in the depths and die.

"The leaves and buds are falling
From many an apple tree;
I watch the mirthful breezes
Embrace them wantonly."

Wenonah later was courted by the caressing West Wind, and becomes pregnant. Wenonah, as a young moon-goddess, has the beauty of the moonlight. Nokomis warns her of the dangerous courtship of Mudjekeewis, the West Wind. But Wenonah allows herself to become infatuated, and conceives from the breath of the wind, from the πνεῦμα, a son, our hero.

"And the West-Wind came at evening,
. . . .
Found the beautiful Wenonah,
Lying there amid the lilies,
Wooed her with his words of sweetness,
Wooed her with his soft caresses,
Till she bore a son in sorrow,
Bore a son of love and sorrow."

Fertilisation through the breath of the spirit is already a well-known precedent for us. The star or comet plainly belongs to the birth scene as a libido symbol; Nokomis, too, comes to earth as a shooting star. Mörike's sweet poetic phantasy has devised a similar divine origin:

"And she who bore me in her womb,
And gave me food and clothing,
She was a maid—a wild, brown maid,
Who looked on men with loathing.

"She fleered at them and laughed out loud,
And bade no suitor tarry;
'I'd rather be the Wind's own bride
Than have a man and marry.'

"Then came the Wind and held her fast,
His captive, love enchanted;
And lo, by him a merry child
Within her womb was planted!"

Buddha's marvellous birth story, retold by Sir Edwin Arnold, also shows traces of this:[10]

"Maya, the Queen
Dreamed a strange dream, dreamed that a star from heaven—
Splendid, six-rayed, in color rosy-pearl,
Whereof the token was an Elephant
Six-tusked and white as milk of Kamadhuk—
Shot through the void; and shining into her,
Entered her womb upon the right."[11]

During Maya's conception a wind blows over the land:

"A wind blew
With unknown freshness over lands and seas."

After the birth the four genii of the East, West, South and North come to render service as bearers of the palanquin (The coming of the wise men at Christ's birth) We also find here a distinct reference to the "four winds" For the completion of the symbolism there is to be found in the Buddha myth, as well as in the birth legend of Christ, besides the impregnation by star and wind, also the fertilisation by an animal, here an elephant, which with is phallic trunk fulfilled in Maya the Christian method of fructification through the ear or the head It is well known that, in addition to the dove, the unicorn is also a procreative symbol of the Logos

Here arises the question why the birth of a hero always had to take place under such strange symbolic circumstances? It might also be imagined that a hero arose from ordinary surroundings and gradually grew out of his inferior environment, perhaps with a thousand troubles and dangers. (And, indeed, this motive is by no means strange in the hero myth) It might be said that superstition demands strange conditions of birth and generation, but why does it demand them?

The answer to this question is that the birth of the hero, as a rule, is not that of an ordinary mortal, but is a rebirth from the mother-spouse, hence it occurs under mysterious ceremonies Therefore, in the very beginning, lies the motive of the two mothers of the hero As Rank[12] has shown us through many examples the hero is often obliged to experience exposure, and upbringing by foster parents, and in this manner he acquires the two mothers A striking example is the relation of Hercules to Hera In the Hiawatha epic Wenonah dies after the birth and Nokomis takes her place Maya dies after the birth[13] and Buddha is given a stepmother The stepmother is sometimes an animal (the she-wolf of Romulus and Remus, etc) The twofold mother may be replaced by the motive of twofold birth, which has attained a lofty significance in the Christian mythology, namely, through baptism, which, as as we have seen, represents rebirth Thus man is born not merely in a commonplace manner, but also born again in a mysterious manner, by means of which he becomes a participator of the kingdom of God, of immortality Anyone may become a hero in this way who is generated anew through his own mother, because only through her does he share in immortality Therefore, it happened that the death of Christ on the cross, which creates universal salvation, was understood as "baptism", that is to say, as rebirth through the second mother, the mysterious tree of death Christ says

"But I have a baptism to be baptized with and how am I straitened till it be accomplished!"—*Luke* xii 50

He interprets his death agony symbolically as birth agony

The motive of the two mothers suggests the thought of self-

rejuvenation, and evidently expresses the fulfilment of the wish that it *might be possible for the mother to bear me again*; at the same time, applied to the heroes, it means one is a hero who is borne again by her who has previously been his mother; that is to say, *a hero is he who may again produce himself through his mother*.

The countless suggestions in the history of the procreation of the heroes indicate the latter formulations. Hiawatha's father first overpowered the mother under the symbol of the bear; then himself becoming a god, he procreates the hero. What Hiawatha had to do as hero, Nokomis hinted to him in the legend of the origin of the moon; he is forcibly to throw his mother upwards (or throw downwards?); then she would become pregnant by this act of violence and could bring forth a daughter. This rejuvenated mother would be allotted, according to the Egyptian rite, as a daughter-wife to the sun-god, the father of his mother, for self-production. What action Hiawatha takes in this regard we shall see presently. We have already studied the behaviour of the pre-Asiatic gods related to Christ. Concerning the pre-existence of Christ, the Gospel of St. John is full of this thought. Thus the speech of John the Baptist:

"This is he of whom I said, After me cometh a man which is preferred before me: for he was before me."—*John* i: 30.

Also the beginning of the gospel is full of deep mythologic significance:

"In the beginning was the Word, and the Word was with God, and the Word was God. The same was in the beginning with God.

(3) "All things were made by him; and without him was not anything made that was made.

(4) "In him was life; and the *life* was the *light of men*.

(5) "And the light shineth in darkness; and the darkness comprehendeth it not.

(6) "There was a man sent from God, whose name was John.

(7) "The same came for a witness, to bear witness of the Light.

(8) "He was not that Light, but was sent to bear witness of that Light.

(9) "That was the true Light, which lighteth every man that cometh into the world."

This is the proclamation of the reappearing light, the reborn sun, which formerly was, and which will be again. In the baptistry at Pisa, Christ is represented bringing the tree of life to man; his head is surrounded by a sun halo. Over this relief stand the words INTROITUS SOLIS.

Because the one born was his own procreator, the history of his procreation is strangely concealed under symbolic events, which are meant to conceal and deny it; hence the extraordinary assertion of the virgin conception. This is meant to hide the incestuous impregnation. But do not let us forget that this naive assertion plays an unusually important part in the ingenious symbolic bridge, which is to guide the libido out from the incestuous bond to higher

and more useful applications, which indicate a new kind of immortality, that is to say, immortal work.

The environment of Hiawatha's youth is of importance.

> "By the shores of Gitche Gumee,
> By the shining Big-Sea-Water,
> Stood the wigwam of Nokomis,
> Daughter of the Moon, Nokomis
> Dark behind it rose the forest,
> Rose the black and gloomy pine trees,
> Rose the firs with cones upon them
> Bright before it beat the water,
> Beat the clear and sunny water,
> Beat the shining Big-Sea-Water"

In this environment Nokomis brought him up Here she taught him the first words, and told him the first fairy tales, and the sounds of the water and the wood were intermingled, so that the child learned not only to understand man's speech, but also that of Nature

> "At the door on summer evenings
> Sat the little Hiawatha,
> Heard the whispering of the pine-trees,
> Heard the lapping of the water,
> Sounds of music, words of wonder
> 'Minne-wawa!'[14] said the pine-trees,
> 'Mudway-aushka!'[15] said the water"

Hiawatha hears human speech in the sounds of Nature, thus he understands Nature's speech The wind says, "Wawa" The cry of the wild goose is "Wawa" Wah-wah-taysee means the small glowworm which enchants him Thus the poet paints most beautifully the gradual gathering of external nature into the compass of the subjective,[16] and the intimate connection of the primary object to which the first lisping words were applied, and from which the first sounds were derived, with the secondary object, the wider nature which usurps imperceptibly the mother's place, and takes possession of those sounds heard first from the mother, and also of those feelings which we all discover later in ourselves in all the warm love of Mother Nature The latter blending, whether pantheistic-philosophic or æsthetic, of the sentimental, cultured man with nature is, looked at retrospectively, a reblending with the mother, who was our primary object, and with whom we truly were once wholly one[17] Therefore, it is not astonishing when we again see emerging in the poetical speech of a modern philosopher, Karl Joel, the old pictures which symbolise the unity with the mother, illustrated by the confluence of subject and object In his recent book, "Seele und Welt" (1912), Joel writes as follows, in the chapter called "Primal Experience"[18]

"I lay on the seashore, the shining waters glittering in my dreamy eyes; at a great distance fluttered the soft breeze; throbbing, shimmering, stirring, lulling to sleep comes the wave beat to the shore—or to the ear? I know not. Distance and nearness become blurred into one; without and within

glide into each other. Nearer and nearer, *as our soul was lulled to sleep by the beating of the waves*; now, like a tender mother, the pulse in my hand it strikes, and now it beats over my soul, devours it, embraces it, while it at the same time floats out like the blue waste of waters. Yet, without and within are one. Glistening and foaming, flowing and fanning and roaring, the entire symphony of the stimuli experienced sounds in one tone, all thought becomes one thought, which becomes one with feeling; the world exhales in the soul and the soul dissolves in the world. Our small life is encircled by a great sleep—*the sleep of our cradle, the sleep of our graves, the sleep of our home from which we go forth in the morning, to which we again return in the evening*; our life but the short journey, the interval between the emergence from the original oneness and the sinking back into it! Blue shimmers the infinite sea, wherein dreams the jelly fish of the primitive life, toward which without ceasing our thoughts hark back dimly through eons of existence. For every happening entails a change and a guarantee of the unity of life. At that moment when they are no longer blended together, in that instant man lifts his *head, blind and dripping, from the depths* of the stream of experience, from the oneness with the experience; at that moment of parting when the unity of life in startled surprise detaches the change and holds it away from itself as something alien, at this moment of alienation the aspects of the experience have been substantialized into subject and object, and in that moment consciousness is born."

Joel paints here, in unmistakable symbolism, the confluence of subject and object as the reunion of mother and child. The symbols agree with those of mythology, even in their details. The encircling and devouring motive is distinctly suggested. The sea, devouring the sun and giving birth to it anew, is already an old acquaintance. The moment of the rise of consciousness, the separation of subject and object is a birth; truly philosophical thought hangs with lame wings upon the few great primitive pictures of human speech, above the simple, all-surpassing greatness of which no thought can rise. The idea of the jelly fish is not "accidental." Once when I was explaining to a patient the maternal significance of water at this contact with the mother complex, she experienced a very unpleasant feeling. "It makes me squirm," she said, "as if I touched a jelly fish." Here, too, the same idea! The blessed state of sleep before birth and after death is, as Joel observed, something like old shadowy memories of that unsuspecting, thoughtless state of early childhood, where as yet no opposition disturbed the peaceful flow of dawning life, to which the inner longing always draws us back again and again, and from which the active life must free itself anew with struggle and death, so that it may not be doomed to destruction. Long before Joel, an Indian chieftain had said the same thing in similar words to one of the restless white men:

"Ah, my brother, you will never learn to know the happiness of thinking nothing and doing nothing; this is next to sleep; this is the most delightful thing there is. Thus we were before birth, thus we shall be after death."[18]

We shall see in Hiawatha's later fate how important his early impressions are in his choice of a wife. Hiawatha's first deed was to kill a roebuck with his arrow:

"Dead he lay there in the forest,
By the ford across the river"

This is typical of Hiawatha's deeds Whatever he kills, for the most part, lies *next to or in the water*, sometimes half in the water half on the land [20] It seems that this must well be so The later adventures will teach us why this must be so. The buck was no ordinary animal, but a magic one, that is to say, one with an additional unconscious significance Hiawatha made for himself gloves and moccasins from its hide, the gloves imparted such strength to his arms that he could crumble rocks to dust, and the moccasins had the virtue of the seven-league boots By enwrapping himself in the buck's skin he really became a giant This motive, together with the death of the animal at the ford,[21] in the water, reveals the fact that the parents are concerned, whose gigantic proportions as compared with the child are of great significance in the unconscious The "toys of giants" is a wish inversion of the infantile phantasy The dream of an eleven-year-old girl expresses this

"I am as high as a church steeple; then a policeman comes I tell him, 'If you say anything, I will cut off your head'"

The "policeman," as the analysis brought out, referred to the father, whose gigantic size was over-compensated by the church steeple In Mexican human sacrifices, the gods were represented by criminals, who were slaughtered and flayed, and the Corybantes then clothed themselves in the bloody skins, in order to illustrate the resurrection of the gods [22] (The snake's casting of his skin as a symbol of rejuvenation)

Hiawatha has, therefore, conquered his parents, primarily the mother, although in the form of a male animal (compare the bear of Mudjekeewis), and from that comes his giant's strength He has taken on the parent's skin and now has himself become a great man Now he started forth to his first great battle to fight with the father Mudjekeewis, in order to avenge his dead mother Wenonah Naturally, under this figure of speech hides the thought that he slays the father, in order to take possession of the mother. Compare the battle of Gilgamesh with the giant Chumbaba and the ensuing conquest of Ishtar The father, in the psychologic sense, merely represents the personification of the incest prohibition, that is to say, resistance, which defends the mother. Instead of the father, it may be a fearful animal (the great bear, the snake, the dragon, etc.) which must be fought and overcome The hero is a hero because he sees in every difficulty of life resistance to the forbidden treasure, and fights that resistance with the complete yearning which strives towards the treasure, attainable with difficulty, or unattainable, the yearning which paralyses and kills the ordinary man.

Hiawatha's father is Mudjekeewis, the west wind, the battle, therefore, takes place in the west Thence came life (impregnation

of Wenonah), thence also came death (death of Wenonah). Hiawatha, therefore, fights the typical battle of the hero for rebirth in the western sea, the battle with the devouring terrible mother, this time in the form of the father. Mudjekeewis, who himself had acquired a divine nature, through his conquest of the bear, now is overpowered by his son:

> "Back retreated Mudjekeewis,
> Rushing westward o'er the mountains,
> Stumbling westward down the mountains,
> Three whole days retreated fighting,
> Still pursued by Hiawatha
> To the doorways of the West-Wind,
> To the portals of the Sunset,
> To the earth's remotest border,
> Where into the empty spaces
> Sinks the sun, as a flamingo
> Drops into her nest at nightfall."

The "three days" are a stereotpyed form representing the stay in the sea prison of night. (Twenty-first until twenty-fourth of December.) Christ, too, remained three days in the underworld. "The treasure, difficult to attain," is captured by the hero during this struggle in the west. In this case the father must make a great concession to the son; he gives him divine nature,[23] that very wind nature, the immortality of which alone protected Mudjekeewis from death. He says to his son:

> "I will share my kingdom with you,
> Ruler shall you be henceforward,
> Of the Northwest-Wind, Keewaydin,
> Of the home-wind, the Keewaydin."

That Hiawatha now becomes ruler of the home-wind has its close parallel in the Gilgamesh epic, where Gilgamesh finally receives the magic herb from the wise old Utnapishtim, who dwells in the West, which brings him safe once more over the sea to his home: but this when he is home again, is retaken from him by a serpent.

When one has slain the father, one can obtain possession of his wife, and when one has conquered the mother, one can free one's self.

On the return journey Hiawatha stops at the clever arrow-maker's who possesses a lovely daughter:

> "And he named her from the river,
> From the water-fall he named her
> Minnehaha, Laughing Water."

When Hiawatha, in his earliest childhood dreaming, felt the sounds of water and wind press upon his ears, he recognised in these sounds of nature the speech of his mother. The murmuring pine trees on the shore of the great sea, said "Minnewawa." And above the murmuring of the winds and the splashing of the water he found

his earliest childhood dreams once again in a woman, "Minnehaha," the laughing water And the hero, before all others, finds in woman the mother, in order to become a child again, and, finally, to solve the riddle of immortality

The fact that Minnehaha's father is a skilful arrowmaker betrays him as the father of the hero (and the woman he had with him as the mother). The father of the hero is very often a skilful carpenter, or other artisan. According to an Arabian legend, Tare,[24] Abraham's father, was a skilful master workman, who could carve arrows from any wood, that is to say, in the Arabian form of speech, he was a procreator of splendid sons [25] Moreover, he was a maker of images of gods Tvashtar, Agni's father, is the maker of the world, a smith and carpenter, the discoverer of fire-boring Joseph, the father of Jesus, was also a carpenter, likewise Kinyras, Adonis's father, who is said to have invented the hammer, the lever, roofing and mining Hephaestus, the father of Hermes, is an artistic master workman and sculptor In fairy tales, the father of the hero is very modestly the traditional woodcutter These conceptions were also alive in the cult of Osiris There the divine image was carved out of a tree trunk and then placed within the hollow of the tree (Frazer "Golden Bough," Part IV) In Rigveda, the world was also hewn out of a tree by the world-sculptor The idea that the hero is his own procreator [26] leads to the fact that he is invested with paternal attributes, and reversedly the heroic attributes are given to the father In Mânî there exists a beautiful union of the motives He accomplishes his great labors as a religious founder, hides himself for years in a cave, he dies, is skinned, stuffed and hung up (hero) Besides he is an artist, and has a crippled foot A similar union of motives is found in Wieland, the smith

Hiawatha kept silent about what he saw at the old arrow-maker's on his return to Nokomis, and he did nothing further to win Minnehaha But now something happened, which, if it were not in an Indian epic, would rather be sought in the history of a neurosis Hiawatha introverted his libido, that is to say, he fell into an extreme resistance against the "real sexual demand" (Freud), he built a hut for himself in the wood, in order to fast there and to experience dreams and visions For the first three days he wandered, as once in his earliest youth, through a forest, and looked at all the animals and plants

> "'Master of life!' he cried, desponding,
> 'Must our lives depend on these things?'"

The question whether our lives must depend upon "these things" is very strange It sounds as if life were derived from these things; that is to say, from nature in general Nature seems suddenly to have assumed a very strange significance This phenomenon can be explained only through the fact that a great amount of libido was stored up and now is given to nature As is well known, men of

even dull and prosy minds, in the spring-time of love, suddenly become aware of nature, and even make poems about it. But we know that libido, prevented from an actual way of transference, always reverts to an earlier way of transference. Minnehaha, the laughing water, is so clearly an allusion to the mother that the secret yearning of the hero for the mother is powerfully touched. Therefore, without having undertaken anything, he goes home to Nokomis; but there again he is driven away, because Minnehaha already stands in his path.

He turns, therefore, even further away, into that early youthful period, the tones of which recall Minnehaha most forcibly to his thoughts, where he learnt to hear the mother-sounds in the sounds of nature. In this very strange revival of the impressions of nature we recognise a regression to those earliest and strongest nature impressions which stand next to the subsequently extinguished, even stronger, impressions which the child received from the mother. The glamour of this feeling for her is transferred to other objects of the childish environment (father's house, playthings, etc.), from which later those magic blissful feelings proceed, which seem to be peculiar to the earliest childish memories. When, therefore, Hiawatha hides himself in the lap of nature, it is really the mother's womb, and it is to be expected that he will emerge again new-born in some form.

Before turning to this new creation arising from introversion, there is still a further significance of the preceding question to be considered: whether life is dependent upon "these things"? Life may depend upon these things in the degree that they serve *for nourishment*. We must infer in this case that suddenly the question of nutrition came very near the hero's heart. (This possibility will be thoroughly proven in what follows.) The question of nutrition, indeed, enters seriously into consideration. First, because regression to the mother necessarily revives that special path of transference, namely, that of nutrition through the mother. As soon as the libido regresses to the presexual stage, there we may expect to see the function of nutrition and its symbols put in place of the sexual function. Thence is derived an essential root of the displacement from below upwards (Freud), because, in the presexual stage, the principal value belongs not to the genitals, but to the mouth. Secondly, because the hero fasted, his hunger becomes predominant. Fasting, as is well known, is employed to silence sexuality; also, it expresses symbolically the resistance against sexuality, translated into the language of the presexual stage. On the fourth day of his fast the hero ceased to address himself to nature; he lay exhausted, with half-closed eyes, upon his couch, sunk deep in dreams, the picture of extreme introversion.

We have already seen that, in such circumstances, an infantile internal equivalent for reality appears, in the place of external life and reality. This is also the case with Hiawatha.

> "And he saw a youth approaching,
> Dressed in garments green and yellow,
> Coming through the purple twilight,
> Through the splendour of the sunset
> Plumes of green bent o'er his forehead,
> And his hair was soft and golden"

This remarkable apparition reveals himself in the following manner to Hiawatha

> "From the Master of Life descending,
> I, the friend of man, Mondamin,
> Come to warn you and instruct you,
> How by struggle and by labor
> You shall gain what you have prayed for.
> Rise up from your beds of branches
> Rise, O youth, and wrestle with me!"

Mondamin is the maize a god, who is eaten, arising from Hiawatha's introversion His hunger, taken in a double sense, his longing for the nourishing mother, gives birth from his soul to another hero, the edible maize, the son of the earth mother Therefore, he again arises at sunset, symbolising the entrance into the mother, and in the western sunset glow he begins again the mystic struggle with the self-created god, the god who has originated entirely from the longing for the nourishing mother The struggle is again the struggle for liberation from this destructive and yet productive longing Mondamin is, therefore, equivalent to the mother, and the struggle with him means the overpowering and impregnation of the mother This interpretation is entirely proven by a myth of the Cherokees, "who invoke it (the maize) under the name of 'The Old Woman,' in allusion to a myth that it sprang from the blood of an old woman killed by her disobedient sons'" [27]

> "Faint with famine, Hiawatha
> Started from his bed of branches,
> From the twilight of his wigwam
> Forth into the flush of sunset
> Came, and wrestled with Mondamin .
> At his touch he felt new courage
> Throbbing in his brain and bosom,
> Felt new life and hope and vigor
> Run through every nerve and fibre"

The battle at sunset with the god of the maize gives Hiawatha new strength , and thus it must be, because the fight for the individual depths, against the paralysing longing for the mother, gives creative strength to men. Here, indeed, is the source of all creation, but it demands heroic courage to fight against these forces and to wrest from them the "treasure difficult to attain" He who succeeds in this has, in truth, attained the best. Hiawatha wrestles with himself for his creation [28] The struggle lasts again the charmed three days. The fourth day, just as Mondamin prophesied, Hiawatha conquers him, and Mondamin sinks to the ground in death

As Mondamin previously desired, Hiawatha digs his grave in mother earth, and soon afterwards from this grave the young and fresh maize grows for the nourishment of mankind

Concerning the thought of this fragment, we have therein a beautiful parallel to the mystery of Mithra, where first the battle of the hero with his bull occurs Afterwards Mithra carries in "transitus" the bull into the cave, where he kills him From this death all fertility grows, all that is edible [29] The cave corresponds to the grave The same idea is represented in the Christian mysteries, although generally in more beautiful human forms The soul struggle of Christ in Gethsemane, where he struggles with himself in order to complete his work, then the "transitus," the carrying of the cross,[30] where he takes upon himself the symbol of the destructive mother, and therewith takes himself to the sacrificial grave, from which, after three days, he triumphantly arises, all these ideas express the same fundamental thoughts Also, the symbol of eating is not lacking in the Christian mystery Christ is a god who is eaten in the Lord's Supper. His death transforms him into bread and wine, which we partake of in grateful memory of his great deed [31] The relation of Agni to the Soma-drink and that of Dionysus to wine [32] must not be omitted here An evident parallel is Samson's rending of the lion, and the subsequent inhabitation of the dead lion by honey bees, which gives rise to the well-known German riddle

"Speise ging von dem Fresser und Süssigkeit von dem Starken (Food went from the glutton and sweet from the strong)" [33]

In the Eleusinian mysteries these thoughts seem to have played a rôle Besides Demeter and Persephone, Iakchos is a chief god of the Eleusinian cult, he was the "puer æternus," the eternal boy, of whom Ovid says the following

"Tu puer æternus, tu formosissimus alto
Conspiceris cœlo tibi cum sine cornibus astas,
Virgineum caput est," etc *

In the great Eleusinian festival procession the image of Iakchos was carried It is not easy to say which god is Iakchos, possibly a boy, or a new-born son, similar to the Etrurian Tages, who bears the surname "the freshly ploughed boy," because, according to the myth, he arose from the furrow of the field behind the peasant, who was ploughing This idea shows unmistakably the Mondamin motive The plough is of well-known phallic meaning, the furrow of the field is personified by the Hindoos as woman The psychology of this idea is that of a coitus, referred back to the presexual stage (stage of nutrition). The son is the edible fruit of the field Iakchos

* Thou boy eternal, thou most beautiful one seen in the heavens, without horns standing, with thy virgin head, etc

passes, in part, as son of Demeter or of Persephone, also appropriately as consort of Demeter (Hero as procreator of himself) He is also called τῆς Δήμητρος ὁ δαίμων (Δαίμων equals libido, also Mother libido) He was identified with Dionysus, especially with the Thracian Dionysus-Zagreus, of whom a typical fate of rebirth was related Hera had goaded the Titans against Zagreus, who assuming many forms, sought to escape them, until they finally took him when he had taken on the form of a bull In this form he was killed (Mithra sacrifice) and dismembered, and the pieces were thrown into a cauldron, but Zeus killed the Titans by lightning, and swallowed the still-throbbing heart of Zagreus Through this act he gave him existence once more, and Zagreus as Iakchos again came forth

Iakchos carries the torch, the phallic symbol of procreation, as Plato testifies In the festival procession, the sheaf of corn, the cradle of Iakchos, was carried (λίκνον, mystica vannus Iacchi) The Orphic legend [34] relates that Iakchos was brought up by Persephone, when, after three years' slumber in the λίκνον,* he awoke This statement distinctly suggests the Mondamin motive The 20th of Boedromion (the month Boedromion lasts from about the 5th of September to the 5th of October) is called Iakchos, in honour of the hero On the evening of this day the great torchlight procession took place on the seashore, in which the quest and lament of Demeter was represented The rôle of Demeter, who, seeking her daughter, wanders over the whole earth without food or drink, has been taken over by Hiawatha in the Indian epic He turns to all created things without obtaining an answer As Demeter first learns of her daughter from the subterranean Hecate, so does Hiawatha first find the one sought for, Mondamin,[35] in the deepest introversion (descent to the mother) Hiawatha produces from himself, Mondamin, as a mother produces the son The longing for the mother also includes the producing mother (first devouring, then birth-giving) Concerning the real contents of the mysteries, we learn through the testimony of Bishop Asterius, about 390 A D, the following

> "Is not there (in Eleusis) the gloomiest descent, and the most solemn communion of the hierophant and the priestess, between him and her alone? Are the torches not extinguished, and does not the vast multitude regard as their salvation that which takes place between the two in the darkness?" [36]

That points undoubtedly to a ritual marriage, which was celebrated subterraneously in mother earth The Priestess of Demeter seems to be the representative of the earth goddess, perhaps the furrow of the field [37] The descent into the earth is also the symbol of the mother's womb, and was a widespread conception under the form of cave worship Plutarch relates of the Magi that they sacrificed

* A winnowing fan used as cradle

to Ahriman, εἰς τόπον ἀνήλιον * Lukian lets the magician Mithrobarzanes εἰς χωρίον ἔρημον καὶ ὑλῶδες καὶ ἀνήλιον,† descend into the bowels of the earth According to the testimony of Moses of the Koran, the sister Fire and the brother Spring were worshipped in Armenia in a cave. Julian gave an account from the Attis legend of a καταβασις εἰς ἄντρον,‡ from whence Cybele brings up her son lover, that is to say, gives birth to him [38] The cave of Christ's birth, in Bethlehem ('House of Bread'), is said to have been an Attis spelæum

A further Eleusinian symbolism is found in the festival of Hierosgamos, in the form of the *mystic chests*, which, according to the testimony of Clemens of Alexandria, may have contained pastry, salt and fruits The synthema (confession) of the mystic transmitted by Clemens is suggestive in still other directions·

" I have fasted, I have drunk of the barleydrink, I have taken from the chest and after I have labored, I have placed it back in the basket, and from the basket into the chest "

The question as to what lay in the chest is explained in detail by Dieterich [39] The labor he considers a phallic activity, which the mystic has to perform. In fact, representations of the mystic basket are given, wherein lies a phallus surrounded by fruits [40] Upon the so-called Lovatelli tomb vase, the sculptures of which are understood to be Eleusinian ceremonies, it is shown how a mystic caressed the serpent entwining Demeter. The caressing of the fear animal indicates a religious conquering of incest [41] According to the testimony of Clemens of Alexandria, a serpent was in the chest The serpent in this connection is naturally of phallic nature, the phallus which is forbidden in relation to the mother Rohde mentions that in the Arrhetophories, pastry, in the form of phalli and serpents, were thrown into the cave near the Thesmophorion This custom was a petition for the bestowal of children and harvest [42] The snake also plays a large part in initiations under the remarkable title ὁ διὰ κόλπου θεός || Clemens observes that the symbol of the Sabazios mysteries is ὁ διὰ κόλπων θεός, δράκων δέ ἐστι καὶ οὗτος διελκόμενος τοῦ κόλπου τῶν τελουμένων §

Through Arnobius we learn

" Aureus coluber in sinum demittitur consecratis et eximitur rursus ab inferioribus partibus atque imis " **

In the Orphic Hymn 52, Bacchus is invoked by ὑποκόλπιε,†† which

* In a sunless place

† Descend into a sunless desert place

‡ Descent into a cave

|| He who achieved divinity through the womb

§ He who achieved divinity through the womb, he is a serpent, and he was drawn through the womb of those who were being initiated

** The golden serpent is crowded into the breast of the initiates and is then drawn out through the lowest parts

†† O Fœtus, he who is in the vagina or womb

indicates that the god enters into man as if through the female genitals[43] According to the testimony of Hippolytus, the hierophant in the mystery exclaimed ἱερὸν ἔτεκε πότνια κοῦρον, Βριμὼ Βριμόν (the revered one has brought forth a holy boy, Brimos from Brimo) This Christmas gospel, "Unto us a son is born," is illustrated especially through the tradition[44] that the Athenians "secretly show to the partakers in the Epoptia, the great and wonderful and most perfect Epoptic mystery, *a mown stalk of wheat*"[45]

The parallel for the motive of death and resurrection is the motive of losing and finding. The motive appears in religious rites in exactly the same connection, namely, in spring festivities similar to the Hierosgamos, where the image of the god was hidden and found again It is an uncanonical tradition that Moses left his father's house when twelve years old to teach mankind In a similar manner Christ is lost by his parents, and they find him again as a teacher of wisdom, just as in the Mohammedan legend Moses and Joshua lose the fish, and in his place Chidher, the teacher of wisdom, appears (like the boy Jesus in the temple); so does the corn god, lost and believed to be dead, suddenly arise again from his mother into renewed youth (That Christ was laid in the manger is suggestive of fodder Robertson, therefore, places the manger as parallel to the liknon)

We understand from these accounts why the Eleusinian mysteries were for the mystic so rich in comfort for the hope of a better world A beautiful Eleusinian epitaph shows this:

> "Truly, a beautiful secret is proclaimed by the blessed Gods!
> Mortality is not a curse, but death a blessing!"

The hymn to Demeter[46] in the mysteries also says the same:

> "Blessed is he, the earth born man, who hath seen this!
> Who hath not shared in these divine ceremonies,
> He hath an unequal fate in the obscure darkness of death"

Immortality is inherent in the Eleusinian symbol, in a church song of the nineteenth century by Samuel Preiswerk we discover it again:

> "The world is yours, Lord Jesus,
> The world, on which we stand,
> Because it is thy world
> It cannot perish
> Only the wheat, before it comes
> Up to the light in its fertility,
> Must die in the bosom of the earth
> First freed from its own nature
>
> "Thou goest, O Lord, our chief,
> To heaven through thy sorrows,
> And guide him who believes
> In thee on the same path



THE SO-CALLED HOLY SEPULCHRE OF S. STEFANO AT BOLOGNA

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> Then take us all equally
> To share in thy sorrows and happiness,
> Guide us through thy gate of death,
> Bring thy world into the light."

Firmicus relates concerning the Attis mysteries:

"Nocte quadam simulacrum in lectica supinum ponitur et per numeros digestis fletibus plangitur; deinde cum se ficta lamentatione satiaverint, lumen infertur: tunc a sacerdote omnium qui flebant fauces unguentur, quibus perunctis sacerdos hoc lento murmure susurrat: 'Θαρρεῖτε μύσται τοῦ θεοῦ σεσωσμένου· ἔσται γὰρ ἡμῖν ἐκ πόνου σωτηρία.'" *

Such parallels show how little human personality and how much divine, that is to say, universally human, is found in the Christ mystery. No man is or, indeed, ever was, a hero, for the hero is a god, and, therefore, impersonal and generally applicable to all. Christ is a "spirit," as is shown in the very early Christian interpretation. In different places of the earth, and in the most varied forms and in the coloring of various periods, the Savior-hero appears as a fruit of the entrance of the libido into the personal maternal depths. The Bacchian consecrations represented upon the Farnese relief contain a scene where a mystic wrapped in a mantle, drawn over his head, was led to Silen, who holds the "λίχνον" (chalice), covered with a cloth. The covering of the head signifies death. The mystic dies, figuratively, like the seed corn, grows again and comes to the corn harvest. Proclus relates that the mystics were buried up to their necks. The Christian church as a place of religious ceremony is really nothing but the grave of a hero (catacombs). The believer descends into the grave, in order to rise from the dead with the hero. That the meaning underlying the church is that of the mother's womb can scarcely be doubted. The symbols of Mass are so distinct that the mythology of the sacred act peeps out everywhere. It is the magic charm of rebirth. The veneration of the Holy Sepulchre is most plain in this respect. A striking example is the Holy Sepulchre of St. Stefano in Bologna. The church itself, a very old polygonal building, consists of the remains of a temple to Isis. The interior contains an artificial spelæum, a so-called Holy Sepulchre, into which one creeps through a very little door. After a long sojourn, the believer reappears reborn from this mother's womb. An Etruscan ossuarium in the archæological museum in Florence is at the same time a statue of Matuta, the goddess of death; the clay figure of the goddess is hollowed within as a receptacle for the ashes. The representations indicate that Matuta

* On a certain night an image is placed lying down in a litter; there is weeping and lamentations among the people, with beatings of bodies and tears. After a time, when they have become exhausted from the lamantations, a light appears; then the priest anoints the throats of all those who were weeping, and softly whispers, 'Take courage, O initiates of the Redeemed Divinity; you shall achieve salvation through your grief.'

is the mother Her chair is adorned with sphinxes, as a fitting symbol for the mother of death

Only a few of the further deeds of Hiawatha can interest us here Among these is the battle with Mishe-Nahma, the fish-king, in the eighth song This deserves to be mentioned as a typical battle of the sun-hero Mishe-Nahma is a fish monster, who dwells at the bottom of the waters Challenged by Hiawatha to battle, he devours the hero, together with his boat

> " In his wrath he darted upward,
> Flashing leaped into the sunshine,
> Opened his great jaws, and swallowed
> Both canoe and Hiawatha
>
> " Down into that darksome cavern
> Plunged the headlong Hiawatha,
> As a log on some black river
> Shoots and plunges down the rapids,
> Found himself in utter darkness,
> Groped about in helpless wonder,
> Till he felt a great heart beating,
> Throbbing in that utter darkness
> And he smote it in his anger,
> With his fist, the heart of Nahma,
> Felt the mighty king of fishes
> Shudder through each nerve and fibre
>
> Crosswise then did Hiawatha
> Drag his birch-canoe for safety,
> Lest from out the jaws of Nahma,
> In the turmoil and confusion,
> Forth he might be hurled, and perish "

It is the typical myth of the work of the hero, distributed over the entire world He takes to a boat, fights with the sea monster, is devoured, he defends himself against being bitten or crushed [47] (resistance or stamping motive) , having arrived in the interior of the " whale dragon," he seeks the vital organ, which he cuts off or in some way destroys Often the death of the monster occurs as the result of a fire which the hero secretly makes within him , he mysteriously creates in the womb of death life, the rising sun Thus dies the fish, which drifts ashore, where, with the assistance of " birds," the hero again attains the light of day [48] The bird in this sense probably means the reascent of the sun, the longing of the libido, the rebirth of the phoenix (The longing is very frequently represented by the symbol of hovering) The sun symbol of the bird rising from the water is (etymologically) contained in the singing swan " Swan " is derived from the root *sven*, like sun and tone (See the preceding) This act signifies rebirth, and the bringing forth of life from the mother [49] and by this means the ultimate destruction of death, which, according to a Negro myth, has come into the world, through the mistake of an old woman, who, at the time of the general casting of skins (for men renewed their youth through



MATUTA, AN ETRUSCAN PIETA

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casting their skin like snakes, drew on, through absent-mindedness, her old skin instead of a new one, and as a result died. But the effect of such an act could not be of any duration. Again and again troubles of the hero are renewed, always under the symbol of deliverance from the mother. Just as Hera (as the persecuting mother) is the real source of the great deeds of Hercules, so does Nokomis allow Hiawatha no rest, and raises up new difficulties in his path, in form of desperate adventures in which the hero may perhaps conquer, but also, perhaps, may perish. The libido of mankind is always in advance of his consciousness; unless his libido calls him forth to new dangers he sinks into slothful inactivity; or, on the other hand, childish longing for the mother overcomes him at the summit of his existence, and he allows himself to become pitifully weak, instead of striving with desperate courage towards the highest. The mother becomes the demon, who summons the hero to adventure, and who also places in his path the poisonous serpent, which will strike him. Thus Nokomis, in the ninth song, calls Hiawatha, points with her hand to the west, where the sun sets in purple splendor, and says to him:

> "Yonder dwells the great Pearl-Feather,
> Megissogwon, the Magician,
> Manito of Wealth and Wampum,
> Guarded by his fiery serpents,
> Guarded by the black pitch-water.
> You can see his fiery serpents,
> The Kenabeek, the great serpents,
> Coiling, playing in the water."

This danger lurking in the west is known to mean death, which no one, even the mightiest, escapes. This magician, as we learn, also killed the father of Nokomis. Now she sends her son forth to avenge her father (Horus). Through the symbols attributed to the magician it may easily be recognised what he symbolises. Snake and water belong to the mother, the snake as a symbol of the repressed longing for the mother, or, in other words, as a symbol of resistance, encircles protectingly and defensively the maternal rock, inhabits the cave, winds itself upwards around the mother tree and guards the precious hoard, the "mysterious" treasure. The black Stygian water is, like the black muddy spring of Dhulqarnein, the place where the sun dies and enters into rebirth, the maternal sea of death and night. On his journey thither Hiawatha takes with him the magic oil of Mishe-Nahma, which helps his boat through the waters of death. (Also a sort of charm for immortality, like the dragon's blood for Siegfried, etc.)

First, Hiawatha slays the great serpent. Of the "night journey in the sea" over the Stygian waters it is written:

> "All night long he sailed upon it,
> Sailed upon that sluggish water,
> Covered with its mould of ages,

Black with rotting water rushes,
Rank with flags, and leaves of lilies,
Stagnant, lifeless, dreary, dismal,
Lighted by the shimmering moonlight
And by will-o'-the-wisps illumined,
Fires by ghosts of dead men kindled,
In their weary night encampments."

The description plainly shows the character of a water of death. The contents of the water point to an already mentioned motive, that of encoiling and devouring. It is said in the "Key to Dreams of Jagaddeva":[50]

"Whoever in dreams surrounds his body with bast, creepers or ropes, with snake-skins, threads, or tissues, dies."

I refer to the preceding arguments in regard to this. Having come into the west land, the hero challenges the magician to battle. A terrible struggle begins. Hiawatha is powerless, because Megissogwon is invulnerable. At evening Hiawatha retires wounded, despairing for a while, in order to rest:

"Paused to rest beneath a pine-tree,
From whose branches trailed the mosses,
And whose trunk was coated over
With the Dead-man's Moccasin-leather,
With the fungus white and yellow."

This protecting tree is described as coated over with the moccasin leather of the dead, the fungus. This investing of the tree with anthromorphic attributes is also an important rite wherever tree worship prevails, as, for example, in India, where each village has its sacred tree, which is clothed and in general treated as a human being. The trees are anointed with fragrant waters, sprinkled with powder, adorned with garlands and draperies. Just as among men, the piercing of the *ears was performed as an apotropaic charm against death, so does it occur with the holy tree.* Of all the trees of India there is none more sacred to the Hindoos than the Aswatha (Ficus religiosa). It is known to them as Vriksha Raja (king of trees), Brahma, Vishnu and Mahesvar live in it, and the worship of it is the worship of the triad. Almost every Indian village has an Aswatha,[51] etc. This "village linden tree," well known to us, is here clearly characterised as the mother symbol; it contains the three gods.

Hence, when Hiawatha retires to rest under the pine-tree,[52] it is a dangerous step, because he resigns himself to the mother, whose garment is the garment of death (the devouring mother). As in the whale-dragon, the hero also in this situation needs a "helpful bird"; that is to say, the helpful animals, which represent the benevolent parents:

"Suddenly from the boughs above him
Sang the Mama, the woodpecker;

"Aim your arrows, Hiawatha,
At the head of Megissogwon,
Strike the tuft of hair upon it,
At their roots the long black tresses;
There alone can he be wounded!"

Now, amusing to relate, Mama hurried to his help. It is a peculiar fact that the woodpecker was also the "Mama" of Romulus and Remus, who put nourishment into the mouths of the twins with his beak.[53] (Compare with that the rôle of the vulture in Leonardo's dream. The vulture is sacred to Mars, like the woodpecker.) With the maternal significance of the woodpecker, the ancient Italian folk-superstition agrees: that from the tree upon which this bird nested any nail which has been driven in will soon drop out again.[54] The woodpecker owes its special significance to the circumstance that he *hammers holes into trees*. ("To drive nails in," as above!) It is, therefore, understandable that he was made much of in the Roman legend as an old king of the country, a possessor or ruler of the holy tree, the primitive image of the Paterfamilias. An old fable relates how Circe, the spouse of King Picus, transformed him into the Picus Martius, the woodpecker. The sorceress is the "new-creating mother," who has "magic influence" upon the sun-husband. She kills him, transforms him into the soul-bird, the unfulfilled wish. Picus was also understood as the wood demon and incubus, as well as the soothsayer, all of which fully indicate the mother libido.[55] Picus was often placed on a par with Picumnus by the ancients. Picumnus is the inseparable companion of Pilumnus, and both are actually called *infantium dii*, "the gods of little children." Especially it was said of Pilumnus that he defended new-born children against the destroying attacks of the wood demon, Silvanus. (Good and bad mother, the motive of the two mothers.)

The benevolent bird, a wish thought of deliverance which arises from introversion,[56] advises the hero to shoot the magician under the hair, which is the only vulnerable spot. This spot is the "phallic" point,[57] if one may venture to say so; it is at *the top of the head*, at the *place where the mystic birth from the head takes place*, which even to-day appears in children's sexual theories. Into that Hiawatha shoots (one may say, very naturally) three arrows[58] (the well-known phallic symbol), and thus kills Megissogwon. Thereupon he steals the magic wampum armor, which renders him invulnerable (means of immortality). He significantly leaves the dead lying in the water—because the magician is the fearful mother:

"On the shore he left the body,
Half on land and half in water,
In the sand his feet were buried,
And his face was in the water."

Thus the situation is the same as with the fish king, because the monster is the personification of the water of death, which in its turn

represents the devouring mother This great deed of Hiawatha's, where he has vanquished the mother as the death-bringing demon,[59] is followed by his marriage with Minnehaha

A little fable which the poet has inserted in the later song is noteworthy An old man is transformed into a youth, by *crawling through a hollow oak tree*

In the fourteenth song is a description of how Hiawatha discovers writing I limit myself to the description of two hieroglyphic tokens :

> Gitche Manito the Mighty,
> He, the Master of Life, was painted
> As an egg, with points projecting
> To the four winds of the heavens
> Everywhere is the Great Spirit,
> Was the meaning of this symbol "

The world lies in the egg, which encompasses it at every point, it is the cosmic woman with child, the symbol of which Plato as well as the Vedas has made use of This mother is like the air which is everywhere. But air is spirit ; the mother of the world is a spirit

> " Mitche Manito the Mighty,
> He the dreadful Spirit of Evil,
> As a serpent was depicted,
> As Kenabeek, the great serpent "

But the spirit of evil is fear, the forbidden desire, the adversary who exposes not only each individual heroic deed, but life in its struggle for eternal duration as well, and who introduces into our body the poison of weakness and age through the treacherous bite of the serpent It is all that is retrogressive, and as the model of our first world is our mother, all retrogressive tendencies are towards the mother, and, therefore, are disguised under the incest image

In both these ideas the poet has represented in mythologic symbols the libido arising from the mother and the libido striving backward towards the mother

There is a description in the fifteenth song how Chibiabos, Hiawatha's best friend, the amiable player and singer, the embodiment of the joy of life, was enticed by the evil spirits into ambush, fell through the ice and was drowned Hiawatha mourns for him so long that he succeeds, with the aid of the magician, in calling him back again But the revivified friend is only a spirit, and he becomes master of the land of spirits (Osiris, lord of the underworld, the two Dioscuri) Battles again follow, and then comes the loss of a second friend, Kwasind, the embodiment of physical strength

In the twentieth song occur famine and the death of Minnehaha, foretold by two taciturn guests from the land of death , and in the twenty-second song Hiawatha prepares for a final journey to the west land

"I am going, O Nokomis,
On a long and distant journey,
To the portals of the Sunset,
To the regions of the home-wind,
Of the Northwest-Wind Keewaydin.

"One long track and trail of splendor,
Down whose stream, as down a river,
Westward, westward Hiawatha
Sailed into the fiery sunset,
Sailed into the purple vapors,
Sailed into the dusk of evening.

"Thus departed Hiawatha,
Hiawatha the Beloved,
In the glory of the sunset,
In the purple mists of evening,
To the regions of the home-wind,
Of the Northwest-Wind, Keewaydin,
To the Islands of the Blessed,
To the kingdom of Ponemah,
To the land of the Hereafter!"

The sun, victoriously arising, tears itself away from the embrace and clasp, from the enveloping womb of the sea, and sinks again into the maternal sea, into night, the all-enveloping and the all-reproducing, leaving behind it the heights of midday and all its glorious works. This image was the first, and was profoundly entitled to become the symbolic carrier of human destiny; in the morning of life man painfully tears himself loose from the mother, from the domestic hearth, to rise through battle to his heights. Not seeing his worst enemy in front of him, but bearing him within himself as a deadly longing for the depths within, for drowning in his own source, for becoming absorbed into the mother, his life is a constant struggle with death, a violent and transitory delivery from the always lurking night. This death is no external enemy, but a deep personal longing for quiet and for the profound peace of non-existence, for a dreamless sleep in the ebb and flow of the sea of life. Even in his highest endeavour for harmony and equilibrium, for philosophic depths and artistic enthusiasm, he seeks death, immobility, satiety and rest. If, like Peirithoos, he tarries too long in this place of rest and peace, he is overcome by torpidity, and the poison of the serpent paralyses him for all time. If he is to live he must fight and sacrifice his longing for the past, in order to rise to his own heights. And having reached the noonday heights, he must also *sacrifice the love for his own achievement*, for he may not loiter. The sun also sacrifices its greatest strength in order to hasten onwards to the fruits of autumn, which are the seeds of immortality; fulfilled in children, in works, in posthumous fame, in a new order of things, all of which in their turn begin and complete the sun's course over again.

The "Song of Hiawatha" contains, as these extracts show, a

material which is very well adapted to bring into play the abundance of ancient symbolic possibilities, latent in the human mind, and to stimulate it to the creation of mythologic figures But the products always contain the same old problems of humanity, which rise again and again in new symbolic disguise from the shadowy world of the unconscious Thus Miss Miller is reminded through the longing of Chiwantopel, of another mythic cycle which appeared in the form of Wagner's "Siegfried" Especially is this shown in the passage in Chiwantopel's monologue, where he exclaims, "There is not one who understands me, not one who resembles me, not one who has a soul sister to mine' Miss Miller observes that the sentiment of this passage has the greatest analogy with the feelings which Siegfried experienced for Brunhilde.

This analogy causes us to cats a glance at the song of Siegfried, especially at the relation of Siegfried and Brunhilde It is a well-recognised fact that Brunhilde, the Valkyr, gives protection to the birth (incestuous) of Siegfried, but while Sieglinde is the human mother, Brunhilde has the rôle of "spiritual mother" (mother-imago). however, unlike Hera towards Hercules, she is not a pursuer, but benevolent. This sin, in which she is an accomplice, by means of the help she renders, is the reason for her banishment by Wotan. The strange birth of Siegfried from the sister-wife distinguishes him as Horus, as the *reborn son*, a reincarnation of the retreating Osiris—Wotan The birth of the young son, of the hero, results, indeed, from mankind, who, however, are merely the human bearers of the cosmic symbolism Thus the birth is protected by the spirit mother (Hera, Lilith) she sends Sieglinde with the child in her womb (Mary's flight) on the "night journey on the sea" to the east.

> "Onward, hasten
> Turn to the East
>
> O woman, thou cherishest
> The sublimest hero of the world
> In thy sheltering womb"

The motive of dismemberment is found again in the broken sword of Siegmund, which was kept for Siegfried From the dismemberment life is pieced together again (The Medea wonder) Just as a smith forges the pieces together, so is the dismembered dead again put together. (This comparison is also found in "Timaios" of Plato the parts of the world joined together with pegs.) In the Rigveda, 10, 72, the creator of the world, Brahmanaspati, is a smith

> "Brahmanaspati, as a blacksmith,
> Welded the world together"

The sword has the significance of the phallic sun power, therefore, a sword proceeds from the mouth of the apocalyptic Christ that is to say, the procreative fire, the word, or the procreative Logos

In Rigveda, Brahmanaspati is also a prayer word, which possessed an ancient creative significance.[60]

> "And the prayer of the singer, expanding out of itself,
> Became a cow, which was already there before the world,
> Dwelling together in the womb of this god
> Foster children of the same keeper are the gods."
>
> —*Rigveda* x, 31.

The Logos became a cow; that is to say, the mother, who is pregnant with the gods. (In Christian uncanonical phantasies, where the Holy Ghost has feminine significance, we have the well-known motive of the two mothers, the earthly mother, Mary, and the spiritual mother, the Holy Ghost.) The transformation of the Logos into the mother is not remarkable in itself, because the origin of the phenomenon fire-speech seems to be the mother-libido, according to the discussion in the earlier chapter. *The spiritual is the mother-libido.* The significance of the sword, in the Sanskrit conception, têjas, is probably partly determined by its sharpness, as is shown above, in its connection with the libido conception. The motive of pursuit (the pursuing Sieglinde, analogous to Leto) is not here bound up with the spiritual mother, but with Wotan, therefore corresponding to the Linos legend, where the father of the wife is also the pursuer. Wotan is also the father of Brunhilde. Brunhilde stands in a peculiar relation to Wotan. Brunhilde says to Wotan:

> "Thou speakest to the will of Wotan
> By telling me what thou wishest:
> Who am I
> Were I not thy will?"
>
> *Wotan:*
> I take counsel only with myself,
> When I speak with thee.

Brunhilde is also somewhat the "angel of the face," that creative will or word,[61] emanating from God, also the Logos, which became the child-bearing woman. God created the world through his word; that is to say, his mother, the woman who is to bring him forth again. (He lays his own egg.) This peculiar conception, it seems to me, can be explained by assuming that the libido overflowing into speech (thought) has preserved its sexual character to an extraordinary degree as a result of the inherent inertia. In this way the "word" had to execute and fulfil all that was denied to the sexual wish; namely, the return into the mother, in order to attain eternal duration. The "word" fulfils this wish by itself becoming the daughter, the wife, the mother of the God who brings him forth anew.[62]

Wagner has this idea vaguely in his mind in Wotan's lament over Brunhilde:

"None as she knew my inmost thought;
None knew the source of my will
As she;
She herself was
The creating womb of my wish;
And so now she has broken
The blessed union!"

Brunhilde's sin is the favouring of Siegmund, but, behind this, lies incest: this is projected into the brother-sister relation of Siegmund and Sieglinde; in reality, and archaically expressed, Wotan, the father, has entered into his self-created daughter, in order to rejuvenate himself. But this fact must, of course, be veiled. Wotan is rightly indignant with Brunhilde, for she has taken the Isis rôle and through the birth of the son has deprived the old man of his power. The first attack of the death serpent in the form of the son, Siegmund, Wotan has repelled; he has broken Siegmund's sword, but Siegmund rises again in a grandson. This inevitable fate is always helped by the woman; hence the wrath of Wotan.

At Siegfried's birth Sieglinde dies, as is proper. The foster-mother [63] is apparently not a woman, but a chthonic god, a crippled dwarf, who belongs to that tribe which renounces love.[64] The Egyptian god of the underworld, the crippled shadow of Osiris (who celebrated a melancholy resurrection in the sexless semi-ape Harpocrates), is the tutor of Horus, who has to avenge the death of his father.

Meanwhile Brunhilde sleeps the enchanted sleep, like a Hieros gamos, upon a mountain, where Wotan has put her to sleep [65] with the magic thorn (Edda), surrounded by the flames of Wotan's fire (equal to libido [66]), which wards off every one. But Mime becomes Siegfried's enemy and wills his death through Fafner. Here Mime's dynamic nature is revealed; he is a masculine representation of the terrible mother, also a foster-mother of demoniac nature, who places the poisonous worm (Typhon) in her son's (Horus's) path. Siegfried's longing for the mother drives him away from Mime, and his travels begin with the mother of death, and lead through vanquishing the "terrible mother" [67] to the woman.

Siegfried:
Off with the imp!
I never would see him more!
Might I but know what my mother was like!
That will my thought never tell me!
Her eyes' tender light
Surely did shine
Like the soft eyes of the doe!

Siegfried decides to separate from the demon which was the mother in the past, and he gropes forward with the longing directed towards the mother. Nature acquires a hidden maternal significance for him ("doe"); in the tones of nature he discovers a suggestion of the maternal voice and the maternal language.

Siegfried:
> Thou gracious birdling,
> Strange art thou to me!
> Dost thou in the wood here dwell?
> Ah, would that I could understand thy sweet stammering!
> Thy song says something to me,—
> Perchance—of my loving mother?

This psychology we have already encountered in Hiawatha. By means of his dialogue with the bird (bird, like wind and arrow represents the wish, the winged longing) Siegfried entices Fafner from the cave. His desires turn back to the mother, and the chthonic demon, the cave-dwelling terror of the woods, appears. Fafner is the protector of the treasure; in his cave lies the hoard, the source of life and power. The mother possesses the libido of the son, and jealously does she guard it. Translated into psychological language, this means the positive transference succeeds only through the release of the libido from the mother-imago, the incestuous object in general. Only in this manner is it possible to gain one's libido, the incomparable treasure, and this requires a mighty struggle, the whole battle of adaptation.[68] The Siegfried legend has abundantly described the outcome of this battle with Fafner. According to the Edda, Siegfried eats Fafner's heart, the seat of life. He wins the magic cap, through whose power Alberich had changed himself into a serpent. This refers to the motive of casting the skin, rejuvenation. By means of the magic cap one can vanish and assume different shapes. The vanishing probably refers to dying and to the invisible presence; that is, existence in the mother's womb. A luck-bringing cap, amniotic covering, the new-born child occasionally wears over his head (the caul). Moreover, Siegfried drinks the dragon's blood, which makes it possible for him to understand the language of birds, and consequently he enters into a peculiar relation with Nature, a dominating position, the result of his knowledge, and finally wins the treasure.

Hort is a mediæval and Old High German word with the meaning of "collected and guarded treasure"; Gothic, *huzd*; Old Scandinavian, *hodd*; Germanic *hozda*, from pre-Germanic *kuzdhó*—for *kudtho*—"the concealed." Kluge[69] adds to this the Greek κεύθω, ἔκυθον="to hide, to conceal." Also *hut* (*hut*, to guard; English, hide), Germanic root *hud*, from Indo-Germanic *kuth* (questionable), to Greek κεύθω and κύθος, "cavity," feminine genitals. Prellwitz,[70] too, traces Gothic *huzd*, Anglo Saxon *hyde*, English hide and hoard, to Greek κεύθω. Whitley Stokes traces English hide, Anglo-Saxon *hydan*, New High German *Hutte*, Latin *cūdo*=helmet; Sanskrit *kuhara* (cave?) to primitive Celtic *koudo*=concealment; Latin, *occultatio*.

The assumption of Kluge is also supported in other directions; namely, from the point of view of the primitive idea.

"There exists in Athens[71] a sacred place (a Temenos) of Ge, with the surname Olympia. Here the ground is torn open for about a yard in width

and they say, after the flood at the time of Deucalion, that the water receded here, and every year they throw into the fissure wheatmeal, kneaded with honey"

We have observed previously that among the Arrhetophorian, pastry in the form of snakes and phalli, was thrown into a crevice in the earth This was mentioned in connection with the ceremonies of fertilising the earth We have touched slightly already upon the sacrifice in the earth crevice among the Watschandies The flood of death has passed characteristically into the crevice of the earth, that is, back into the mother again, because from the mother the universal great death has come in the first place The flood is simply the counterpart of the vivifying and all-producing water 'Ωκεανοῦ, ὅσ περ γένεσις πάντεσσι τέτυκται * One sacrifices the honey cake to the mother, so that she may spare one from death Thus every year in Rome a gold sacrifice was thrown into the lacus Curtius, into the former fissure in the earth, which could only be closed through the sacrificial death of Curtius He was the typical hero, who has journeyed into the underworld, in order to conquer the danger threatening the Roman state from the opening of the abyss. (Kaineus, Amphiaraos) In the Amphiaraion of Oropos those healed through the temple incubation threw their gifts of gold into the sacred well, of which Pausanias says

"If any one is healed of a sickness through a saying of the oracle, then it is customary to throw a silver or gold coin into the well, because here Amphiaraos has ascended as a god"

It is probable that this oropic well is also the place of his "Katabasis" (descent into the lower world) There were many entrances into Hades in antiquity Thus near Eleusis there was an abyss, through which Aidoneus passed up and down, when he kidnapped Cora (Dragon and maiden the libido overcome by resistance, life replaced by death) There were crevices in the rocks, through which souls could ascend to the upper world Behind the temple of Chthonia in Hermione lay a sacred district of Pluto, with a ravine through which Hercules had brought up Cerberus, in addition, there was an "Acherusian" lake [72] This ravine was, therefore, the entrance to the place where death was conquered The lake also belongs here as a further mother symbol, for symbols appear massed together, as they are surrogates, and, therefore, do not afford the same satisfaction of desire as accorded by reality, so that the unsatisfied remnant of the libido must seek still further symbolic outlets The ravine in the Areopagus in Athens was considered the seat of inhabitants of the lower world An old Grecian custom [73] suggests a similar idea Girls were sent into a cavern, where a poisonous snake dwelt, as a test of virginity. If they were bitten by the snake, it was a token that they were no

* Ocean, who arose to be the producer of all

longer chaste We find this same motive again in the Roman legend of St Silvester, at the end of the fifth century [74]

"Erat draco immanissimus in monte Tarpeio in quo est Capitolium collocatum Ad hunc draconem per CCCLXV gradus, quasi ad infernum, magi cum virginibus sacrilegis descendebant semel in mense cum sacrificiis et lustris, ex quibus esca poterat tanto draconi inferri Hic draco subito ex improviso ascendebat et licet non egrederetur vicinos tamen aeres flatu suo vitiabat Ex quo mortalitas hominum et maxima luctus de morte veniebat infantium (Lilith motive) Sanctus itaque Silvester cum haberet cum paganis pro defensione veritatis conflictum, ad hoc venit ut dicerent ei pagani 'Silvester descende ad draconem et fac eum in nomine Dei tui vel uno anno ab interfectione generis humani cessare'" *

St Peter appeared to Silvester in a dream and advised him to close his door to the underworld with chains, according to the model in Revelation, chap xx

(1) "And I saw an angel come down from heaven having the key of the bottomless pit, and a great chain in his hand

(2) "And he laid hold on the dragon, that old serpent which is the Devil and Satan, and bound him a thousand year

(3) "And cast him into the bottomless pit, and shut him up, and set a seal upon him"

The anonymous author of a writing, "De Promissionibus," [75] of the beginning of the fifth century, mentions a very similar legend

"Apud urbem Roman specus quidam fuit in quo draco mirae magnitudinis mechanica arte formatus, gladium ore portans, [76] oculis rutilantibus gemmis [77] metuendus ac terribilis apparebat Hinc annuae devotae virgines floribus exornatae, eo modo in sacrificio dabantur, quatenus inscias munera deferentes gradum scalæ, quo certe ille arte diaboli draco pendebat, contingentes impetus venientis gladii perimeret, ut sanguinem funderet innocentem Et hunc quidam monachus, bene ob meritum cognitus Stiliconi tunc patricio, eo modo subvertit, baculo, manu, singulos gradus palpandos inspiciens, statim ut illum tangens fraudem diabolicam repperit, eo transgresso descendens, draconem scidit, misitque in partes ostendens et hic deos non esse qui manu fiunt" †

* There was a huge dragon on Mount Tarpeius, where the Capitolium stands Once a month, with sacrilegious maidens, the priests descended 365 steps into the hell of this dragon, carrying expiatory offerings of food for the dragon Then the dragon suddenly and unexpectedly arose, and, though he did not come out, he poisoned the air with his breath Thence came the mortality of man and the deepest sorrow for the death of the children When, for the defence of truth, St Silvester had had a conflict with the heathen, it came to this that the heathen said "Silvester, go down to the dragon, and in the name of thy God make him desist from the killing of mankind"

† Near the city of Rome there was a certain cavern in which appeared a dragon of remarkable size, mechanically produced, brandishing a sword in his mouth, his eyes glittering like gems, fearful and terrible Hither came virgins every year, devoted to this service, adorned with flowers, who were given to him in sacrifice Bringing these gifts they unknowingly descended the steps to a point where, with diabolical cunning, the dragon was suspended, striking those who came a blow with the sword, so that the innocent blood was shed Now, there was a certain monk who, on account of his good deeds, was well known to Stilico, the patrician, he killed this dragon as follows He examined each separate step carefully, both with a rod and his own hand,

The *hero battling with the dragon has much in common with the dragon*, and also he takes over his qualities, for example, invulnerability As the footnotes show, the similarity is carried still further (sparkling eyes, sword in his mouth) Translated psychologically, the dragon is merely the son's repressed longing, striving towards the mother, therefore, the son is the dragon, as even Christ is identified with the serpent, which, once upon a time, similia similibus, had controlled the snake plague in the Wilderness. John iii 14 *As a serpent he is to be crucified: that is to say, as one striving backwards towards the mother, he must die hanging or suspended on the mother tree* Christ and the dragon of the Antichrist are in the closest contact in the history of their appearance and their cosmic meaning (Compare Bousset, the Antichrist) The legend of the dragon concealed in the Antichrist myth belongs to the life of the hero, and, therefore, is immortal In none of the newer forms of myth are the pairs of opposites so perceptibly near as in that of Christ and Antichrist (I refer to the remarkable psychologic description of this problem in Mereschkowski's romance, "Leonardo da Vinci") That the dragon is only an artifice is a useful and delightfully rationalistic conceit, which is most significant for that period In this way the dismal gods were effectually vulgarised The schizophrenic insane readily make use of this mechanism, in order to depreciate efficient personalities One often hears the stereotyped lament, "It is all a play, artificial, made up," etc A dream of a "schizophrenic" is most significant, he is sitting in a dark room, which has only a single small window, through which he can see the sky The sun and moon appear, but they are only made artificially from oil paper (Denial of the deleterious incest influence)

The descent of the three hundred and sixty-five steps refers to the sun's course, to the cavern of death and rebirth. That this cavern actually stands in a relation to the subterranean mother of death can be shown by a note in Malalas, the historian of Antioch,[78] who relates that Diocletian consecrated there a crypt to Hecate, to which one descends by three hundred and sixty-five steps Cave mysteries seem to have been celebrated for Hecate in Samothrace as well The serpent also played a great part as a regular symbolic attribute in the service of Hecate The mysteries of Hecate flourished in Rome towards the end of the fourth century, so that the two foregoing legends might indeed relate to her cult Hecate[79] is a real spectral goddess of night and phantoms, a Mar, she is represented as riding, and in Hesiod occurs as the *patron* of riders She sends the horrible nocturnal fear phantom, the Empusa, of whom Aristophanes says that she appears inclosed in a *bladder*

until, discovering the false step, he exposed the diabolical fraud Then, jumping over this step, he went down and killed the dragon, cutting him to pieces, demonstrating that one who could be destroyed by human hand could not be a divinity

swollen with blood. According to Libanius, the mother of Aischines is also called Empusa, for the reason that ἐκ σκοτεινῶν τόπων τοῖς παισὶν καὶ ταῖς γυναιξὶν ὡρμᾶτο."*

Empusa, like Hecate, has *peculiar* feet; one foot is made of brass, the other of ass' dung. Hecate has snakelike feet, which, as in the triple form ascribed to Hecate, points to her phallic libido nature.[80] In Tralles, Hecate appears next to Priapus; there is also a Hecate Aphrodisias. Her symbols are the key,[81] the whip,[82] the snake,[83] the dagger[84] and the torch.[85] As mother of death, dogs accompany her, the significance of which we have previously discussed at length. As guardian of the door of Hades and as Goddess of dogs, she is of threefold form, and really identified with Cerberus. Thus Hercules, in bringing up Cerberus, brings the conquered mother of death into the upper world. As spirit mother (moon!), she sends madness, lunacy. (This mythical observation states that "the mother" sends madness; by far the majority of the cases of insanity consist, in fact, in the domination of the individual by the material of the incest phantasy.) In the mysteries of Cerberus, a rod, called λευκόφυλλος,† was broken off. This rod protected the purity of virgins, and caused any one who touched the plant to become insane. We recognise in this the motive of the sacred tree, which, as mother, must not be touched, an act which only an insane person would commit. Hecate, as nightmare, appears in the form of Empusa, in a vampire rôle, or as devourer of men; perhaps, also, in that more beautiful guise, "The Bride of Corinth." She is the mother of all charms and witches, the patron of Medea, because the power of the "terrible mother" is magical and irresistible (working upward from the unconscious). In Greek syncretism, she plays a very significant rôle. She is confused with Artemis, who also has the surname ἑκάτη,‡ "the one striking at a distance" or "striking according to her will," in which we recognise again her superior power. Artemis is the huntress, with hounds, and so Hecate, through confusion with her, becomes κυνηγετική, the wild nocturnal huntress. (God, as huntsman, see above.) She has her name in common with Apollo, ἕκατος ἑκάεργος.|| From the standpoint of the libido theory this connection is easily understandable, because Apollo merely symbolises the more positive side of the same amount of libido. The confusion of Hecate with Brimo as subterranean mother is understandable; also with Persephone and Rhea, the primitive all-mother. Intelligible through the maternal significance is the confusion with Ilithyia, the midwife. Hecate is also the direct goddess of births, κουροτρόφος,§ the multiplier of cattle, and goddess

* Out of dark places she rushes on children and women.

† White-leaved.

‡ Far shooting Hecate.

|| Far shooting, the far darting.

§ Goddess of birth.

of marriage Hecate, orphically, occupies the centre of the world as Aphrodite and Gaia, even as the world soul in general On a carved gem [86] she is represented carrying the cross on her head The beam on which the criminal was scourged is called ἑκάτη * To her, as to the Roman Trivia, the triple roads, or *Scheideweg*, " forked road," or crossways were dedicated And where roads branch off or unite sacrifices of dogs were brought her , there the bodies of the executed were thrown , the sacrifice occurs at the *point of crossing* Etymologically, *scheide*, " sheath " , for example, sword-sheath, sheath for water-shed and sheath for vagina, is identical with *scheiden*, " to split," or " to separate." The meaning of a sacrifice at this place would, therefore, be as follows to offer something to the mother at the place of junction or at the fissure (Compare the sacrifice to the chthonic gods in the abyss) The Temenos of Ge, the abyss and the well, are easily understood as the gates of life and death,[87] " past which every one gladly creeps " (Faust), and sacrifices there his obolus or his πελανοί,† instead of his body, just as Hercules soothes Cerberus with the honey cakes (Compare with this the mythical significance of the dog !) Thus the crevice at Delphi, with the spring, Castalia, was the seat of the chthonic dragon, Python, who was conquered by the sun-hero, Apollo. (Python, incited by Hera, pursued Leta, pregnant with Apollo , but she, on the floating island of Delos [nocturnal journey on the sea], gave birth to her child, who later slew the Python , that is to say, conquered in it the spirit mother) In Hierapolis (Edessa) the temple was erected above the crevice through which the flood had poured out, and in Jerusalem the foundation stone of the temple covered the great abyss,[88] just as Christian churches are frequently built over caves, grottoes, wells, etc. In the Mithra grotto,[89] and all the other sacred caves up to the Christian catacombs, which owe their significance not to the legendary persecutions but to the worship of the dead,[90] we come across the same fundamental motive The burial of the dead in a holy place (in the " garden of the dead," in cloisters, crypts, etc) is restitution to the mother, with the certain hope of resurrection by which such burial is rightfully rewarded. The animal of death which dwells in the cave had to be soothed in early times through human sacrifices, later with natural gifts [91] Therefore, the Attic custom gives to the dead the μελιτοῦττα, to pacify the dog of hell, the three-headed monster at the gate of the underworld A more recent elaboration of the natural gifts seems to be the obolus for Charon, who is, therefore, designated by Rohde as the second Cerberus, corresponding to the Egyptian dog-faced god Anubis [92] Dog and serpent of the underworld (Dragon) are likewise identical In the tragedies, the Erinnyes are serpents as well as dogs , the serpents Tychon and Echidna are parents of the serpents—Hydra, the dragon of the Hesperides, and

* Hecate

† Sacrificial cakes offered to the gods

Gorgo ; and of the dogs, Cerberus, Orthrus, Scylla [93] Serpents and dogs are also protectors of the treasure The chthonic god was probably always a serpent dwelling in a cave, and was fed with πέλανοι * In the Asclepiadean of the later period, the sacred serpents were scarcely visible, meaning that they probably existed only figuratively [94] Nothing was left but the hole in which the snake was said to dwell There the πέλανοι* were placed, later the obolus was thrown in The sacred cavern in the temple of Kos consisted of a rectangular pit, upon which was laid a stone lid, with a square hole, this arrangement serves the purpose of a treasure house The snake hole had become a slit for money, a "spiritual box," and the cave had become a "treasure" That this development, which Herzog traces, agrees excellently with the actual condition is shown by a discovery in the temple of Asclepius and Hygieia in Ptolemais

" An encoiled granite snake, with arched neck, was found In the middle of the coil is seen a narrow slit, polished by usage, just large enough to allow a coin of four centimeters diameter at most to fall through At the side are holes for handles to lift the heavy pieces, the under half of which is used as a cover "—*Herzog, Ibid* , p 212

The serpent, as protector of the hoard, now lies on the treasure house The fear of the maternal womb of death has become the guardian of the treasure of life That the snake in this connection is really a symbol of death, that is to say, of the dead libido, results from the fact that the souls of the dead, like the chthonic gods, appear as *serpents*, as dwellers in the kingdom of the mother of death [95] This development of symbol allows us to recognise easily the transition of the originally very primitive significance of the crevice in the earth as mother to the meaning of treasure house, and can, therefore, support the etymology of *Hort*, "hoard, treasure," as suggested by Kluge κεύθω, belonging to κεῦθος, means the innermost womb of the earth (Hades) , κύσθος, that Kluge adds, is of similar meaning, cavity or womb Prellwitz does not mention this connection Fick,[96] however, compares New High German *hort*, Gothic *huzd*, to Armenian *kust*, "abdomen" , Church Slavonian *cista*, Vedic *kostha*=abdomen, from the Indo-Germanic root *koustho-s*=viscera, lower abdomen, room, store-room Prellwitz compares κύσθος κύστις=urinary bladder, bag, purse , Sanskrit *kustha-s*=cavity of the loins ; then κύτος=cavity, vault , κύτις=little chest, from κυέω=I am pregnant Here, from κυτος=cave, κύαρ=hole, κύαθος = cup, κύλα = depression under the eye, κῦμα = swelling, wave, billow, κῦρος = power, force, κύριος = lord, Old Iranian *caur*, *cur*=hero , Sanskrit *çura-s*=strong, hero The fundamental Indo-Germanic roots [97] are *kevo*=to swell, to be strong. From that the above-mentioned κυέω, κύαρ, κῦρος and Latin *cavus*=hollow, vaulted, cavity, hole , *cavea*=cavity, enclosure, cage, scene

* Ritual sacrificial food offered to the gods

and assembly; *caulæ*=cavity, opening, enclosure, stall[98]; *kueyô*=swell; participle, *kucyonts*=swelling; *en-kucyonts*=pregnant ἐγκυέωι=Latin *inciens*=pregnant; compare Sanskrit *vi-çvâyan*=swelling; *kûr o-s* (*kevaro -s*), strong, powerful hero.

The treasure which the hero fetches from the dark cavern is swelling life; it is himself, the hero, newborn from the anxiety of pregnancy and the birth throes. Thus the Hindoo fire-bringer is called Mataricvan, meaning the one swelling in the mother. The *hero striving towards the mother is the dragon, and when he separates from the mother he becomes the conqueror of the dragon*.[99] This train of thought, which we have already hinted at previously in Christ and Antichrist, may be traced even into the details of Christian phantasy. There is a series of mediæval pictures[100] in which the communion cup contains a dragon, a snake or some sort of small animal.[101]

The cup is the receptacle, the maternal womb, of the god resurrected in the wine; the cup is the cavern where the serpent dwells, the god who sheds his skin, in the state of metamorphosis; for Christ is also the serpent. These symbolisms are used in an obscure connection in 1 Corinthians, verse 10. Paul writes of the Jews who "were all baptised unto Moses in the cloud and in the sea" (also reborn) and "did all drink the same spiritual drink; for they drank of that spiritual rock that followed them, and that rock was Christ." They drank from the mother (the generative rock, birth from the rock) the milk of rejuvenation, the mead of immortality, and this Rock was Christ, here identified with the mother, because he is the symbolic representative of the mother libido. When we drink from the cup, then we drink from the mother's breast immortality and everlasting salvation. Paul wrote of the Jews that they ate and then rose up to dance and to indulge in fornication, and then twenty-three thousand of them were swept off by the plague of serpents. The remedy for the survivors, however, was the sight of a serpent hanging on a pole. From it was derived the cure.

"The cup of blessing which we bless, is it not the communion of the blood of Christ? The bread which we break, is it not the communion of the body of Christ? For we being many are one bread, and one body; for we are all partakers of one bread."—*I Corinthians* x. 16, 17.

Bread and wine are the body and the blood of Christ; the food of the immortals who are brothers with Christ, ἀδελφοί, those who come from the same womb. We who are reborn again from the mother are all heroes together with Christ, and enjoy immortal food. As with the Jews, so too with the Christians, there is imminent danger of unworthy partaking, for this mystery, which is very closely related psychologically with the subterranean Hierosgamos of Eleusis, involves a mysterious union of man in a spiritual sense,[102] which was constantly misunderstood by the profane and was retranslated into his language, where mystery is equivalent to orgy



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and secrecy to vice.[103] A very interesting blasphemer and sectarian of the beginning of the nineteenth century, named Unternährer, has made the following comment on the Last Supper:

"The communion of the devil is in the brothel. All they sacrifice, i.e., they sacrifice to the devil and not to God. There they have the devil's cup and the devil's dish; *there they have sucked the head of the viper*,[104] there they have fed upon the iniquitous bread and drunk of the wine of wickedness."[105]

Unternährer is an adherent or a forerunner of the "theory of living one's own nature." He dreams of himself as a sort of priapic divinity; he says of himself:

"Black-haired, very charming and handsome in countenance, and every one enjoys listening to thee on account of the amiable speeches which come from thy mouth; therefore the maids love thee."

He preaches "the cult of nakedness":

"Ye fools and blind men, behold God has created man in his image, as male and female, and has blessed them and said, 'Be fruitful and multiply and fill the earth, and make it subject to thee.' Therefore, he has given the greatest honor to these poor members and has placed them naked in the garden," etc.

"Now are the fig leaves and the covering removed, because thou hast turned to the Lord, for the Lord is the Spirit, and where the spirit of the Lord is, there is freedom,[106] there the clearness of the Lord is mirrored with uncovered countenance. This is precious before God, and this is the glory of the Lord, and the adornment of our God, when you stand in the image and honor of your God, as God created you, naked and not ashamed.

"Who can ever praise sufficiently in the sons and daughters of the living God those parts of the body which are destined to procreate?

"In the lap of the daughters of Jerusalem is the gate of the Lord, and the Just will go into the temple there, to the altar.[107] And in the lap of the sons of the living God is the water-pipe of the upper part, which is a tube, like a rod, to measure the temple and altar. And under the water-tube the sacred stones are placed, as a sign and testimony of the Lord, who has taken to himself the seed of Abraham.

"Out of the seeds in the chamber of the mother, God creates a man with his hands, as an image of himself. Then the mother house and the mother chamber is opened in the daughters of the Living God, and God himself brings forth a child through them. Thus God creates children from the stones, for the seed comes from the stones."[108]

History teaches in manifold examples how the religious mysteries are liable to change suddenly into sexual orgies because they have originated from an overvaluation of the orgy. It is characteristic that this priapic divinity[109] returns again to the old symbol of the snake, which in the mystery enters into the faithful, fertilising and spiritualising them, although it originally possessed a phallic significance. In the mysteries of the Ophites, the festival was really celebrated with serpents, in which the animals were even kissed. (Compare the caressing of the snake of Demeter in the Eleusinian mysteries.) In the sexual orgies of the modern Christian sects the phallic kiss plays a very important rôle. Unternährer was an uncultivated, crazy peasant, and it is unlikely that the Ophitic religious ceremonies were known to him.

The phallic significance is expressed negatively or mysteriously through the serpent, which always points to a secret related thought This related thought connects with the mother, thus, in a dream a patient found the following imagery "A serpent shot out from a moist cave and bit the dreamer in the region of the genitals" This dream took place at the instant when the patient was convinced of the truth of the analysis, and began to free himself from the bond of his mother complex The meaning is. I am convinced that I am inspired and poisoned by the mother The contrary manner of expression is characteristic of the dream At the moment when he felt the impulse to go forwards he perceived the attachment to the mother. Another patient had the following dream during a relapse, in which the libido was again wholly introverted for a time "She was entirely filled within by a great snake, only one end of the tail peeped out from her arm She wanted to seize it, but it escaped her" A patient with a very strong introversion (catatonic state) complained to me that a snake was stuck in her throat [110] This symbolism is also used by Nietzsche in the "vision" of the shepherd and the snake [111]

"And verily, what I saw was like nothing I ever saw before I saw a young shepherd, writhing, choking, twitching with a convulsed face, from whose mouth hung a black, heavy serpent

"Did I ever see so much disgust and pallid fear upon a countenance ?[112] Might he have been sleeping, and the snake crept into his mouth—there it bit him fast ?

"My hand tore at the serpent and tore—in vain !—I failed to tear the serpent out of his mouth Then there cried out of me 'Bite ! Bite ! Its head off ! Bite !' I exclaimed, all my horror, my hate, my disgust, my compassion, all the good and bad cried out from me in one voice

"Ye intrepid ones around me ! solve for me the riddle which I saw, make clear to me the vision of the lonesomest one

"For it was a vision and a prophecy; what did then I behold in parable ? And who is it who is still to come ?

"Who is the shepherd into whose mouth crept the snake ? Who is the man into whose throat all the heaviness and the blackest would creep ?[113]

"But the shepherd bit, as my cry had told him, he bit with a huge bite ! Far away did he spit the head of the serpent—and sprang up

"No longer shepherd, no longer man, a transfigured being, an illuminated being, who laughed ! Never yet on earth did a man laugh as he laughed !

"O my brethren, I heard a laugh which was no human laughter—and now a thirst consumeth me, a longing that is never allayed

"My longing for this laugh eats into me Oh, how can I suffer still to live ! And how now can I bear to die !" [114]

The snake represents the introverting libido Through introversion one is fertilised, inspired, regenerated and reborn from the God In Hindoo philosophy this idea of creative, intellectual activity has even cosmogenic significance The unknown original creator of all things is, according to Rigveda 10, 121, Prajâpati, the "Lord of Creation" In the various Brahmas, his cosmogenic activity was depicted in the following manner

Prajâpati desired 'I will procreate myself, I will be manifold' He performed Tapas, after he had performed Tapas he created these worlds '

The strange conception of Tapas is to be translated, according to Deussen,[115] as "he heated himself with his own heat,[116] with the sense of 'he brooded, he hatched.'" Here the hatcher and the hatched are not two, but one and the same identical being. As Hiranyagarbha, Prajâpati is the egg produced from himself, the world-egg, from which he hatches himself. He creeps into himself, he becomes his own uterus, becomes pregnant with himself, in order to give birth to the world of multiplicity. Thus Prajâpati through the way of introversion changed into something new, the multiplicity of the world. It is of especial interest to note how the most remote things come into contact. Deussen says:

"In the degree that the conception of Tapas (heat) became acclimated in hot India as the symbol of exertion and distress, the 'tapo atapyata' began to pass over into the meaning of self-castigation and became related to the idea that creation is an act of *self-renunciation* on the part of the creator."

Self-incubation and self-castigation and introversion are very closely connected ideas.[117] The Zosimos vision mentioned above betrays the same train of thought, where it is said of the place of transformation: ὁ τόπος τῆς ἀσκήσεως.* We have already observed that the place of transformation is really the uterus. Absorption in one's self (introversion) is an entrance into one's own uterus, and also at the same time asceticism. In the philosophy of the Brahmans the world arose from this activity; among the post-Christian Gnostics it produced the revival and spiritual rebirth of the individual, who was born into a new spiritual world. The Hindoo philosophy is considerably more daring and logical, and assumes that creation results from introversion in general, as in the wonderful hymn of Rigveda, 10, 29, it is said:

"What was hidden in the shell,
Was born through the power of fiery torment.
From this first arose love,
As the germ of knowledge,
The wise found the root of existence in non-existence,
By investigating the heart impulses."[118]

This philosophical view interprets the world as an emanation of the libido, and this must be widely accepted from the theoretic as well as the psychologic standpoint, for the function of reality is an instinctive function, having the character of biological adaptation. When the insane Schreber brought about the end of the world through his libido-introversion, he expressed an entirely rational psychologic view, just as Schopenhauer wished to abolish through negation (holiness, asceticism) the error of the primal will, through which the world was created. Does not Goethe say:

"You follow a false trail;
Do not think that we are not serious;
Is not the kernel of nature
In the hearts of men?"

* The place of discipline.

The hero, who is to accomplish the rejuvenation of the world and the conquest of death, is the libido, which, brooding upon itself in introversion, coiling as a snake around its own egg, apparently threatens life with a poisonous bite, in order to lead it to death, and from that darkness, conquering itself, gives birth to itself again. Nietzsche knows this conception [119]

> " How long have you sat already upon your misfortune,
> Give heed ! lest you hatch an egg,
> A basilisk egg
> Of your long travail "

The hero is himself a serpent, himself a sacrificer and a sacrificed. The hero himself is of *serpent nature*, therefore, Christ compares himself with the serpent, therefore, the redeeming principle of the world of that Gnostic sect which styled itself the Ophite was the serpent The serpent is the Agatho and Kako demon. It is, indeed, intelligible, when, in the Germanic saga, they say that the heroes had serpents' eyes.[120] I recall the parallel previously drawn between the eyes of the Son of man and those of the Tarpeian dragon In the already mentioned mediæval pictures, the dragon, instead of the Lord, appeared in the cup, the dragon who with changeful, serpent glances [121] guarded the divine mystery of renewed rebirth in the maternal womb In Nietzsche the old, apparently long extinct idea is again revived [122]

> Ailing with tenderness, just as the thawing wind,
> Zarathustra sits waiting, waiting on his hill,
> Sweetened and cooked in his own juice,
> Beneath his summits,
> Beneath his ice he sits,
> Weary and happy,
> A Creator on his seventh day
> Silence !
> It is my truth !
> From hesitating eyes—
> From velvety shadows
> Her glance meets mine,
> Lovely, mischievous, the glance of a girl
> She divines the reason of my happiness,
> She divines me—ha ! what is she plotting ?
> A purple dragon lurks
> In the abyss of her maiden glance [123]
> Woe to thee, Zarathustra,
> Thou seemest like some one
> Who has swallowed gold,
> Thy belly will be slit open " [124]

In this poem nearly all the symbolism is collected which we have elaborated previously from other connections Distinct traces of the primitive identity of serpent and hero are still extant in the myth of Cecrops Cecrops is himself half-snake, half man Originally, he probably was the Athenian snake of the citadel itself As a buried god, he is like Erechtheus, a chthonic snake god Above his subterranean dwelling rises the Parthenon, the temple of the

virgin goddess (compare the analogous idea of the Christian church). The casting of the skin of the god, which we have already mentioned in passing, stands in the closest relation to the nature of the hero. We have spoken already of the Mexican god who casts his skin. It is also told of Mani, the founder of the Manichæan sect, that he was killed, skinned, stuffed and hung up.[125] That is the death of Christ, merely in another mythological form.[126]

Marsyas, who seems to be a substitute for Attis, the son-lover of Cybele, was also skinned.[127] Whenever a Scythian king died, slaves and horses were slaughtered, skinned and stuffed, and then set up again.[128] In Phrygia, the representatives of the father god were killed and skinned. The same was done in Athens with an ox, who was skinned and stuffed and again hitched to the plough.

In this manner the revival of the fertility of the earth was celebrated.[129]

This readily explains the fragment from the Sabazios mysteries, transmitted to us by Firmicus:[130] *Ταῦρος δράκοντος καὶ πατὴρ ταύρου δράκων.**

The active fructifying (upward striving) form of the libido is changed into the negative force striving downwards towards death. The hero as zodion of spring (ram, bull) conquers the depths of winter; and beyond the summer solstice is attacked by the unconscious longing for death, and is bitten by the snake. However, he himself is the snake. But he is at war with himself, and, therefore, the descent and the end appear to him as the malicious inventions of the mother of death, who in this way wishes to draw him to herself. The mysteries, however, consolingly promise that there is no contradiction[131] or disharmony when life is changed into death. *ταῦρος δράκοντος καὶ πατὴρ ταύρου δράκων.*

Nietzsche, too, gives expression to this mystery:[132]

> "*Here do I sit now,*
> That is, I'm swallowed down
> By this the smallest oasis—
> —It opened up just yawning,
> Its loveliest maw agape.
> Hail! hail! to that whalefish,
> When he for his guests' welfare
> Provided thus!
>
> . . .
>
> Hail to his belly
> If he had also
> Such a lovely oasis belly—
> The desert grows, woe to him
> Who hides the desert!
> Stone grinds on stone, the desert
> Gulps and strangles.

* The bull, father of the serpent, and the serpent, father of the bull.

The monstrous death gazes, glowing brown,
And chews—his life is his chewing
Forget not, O man, burnt out by lust,
Thou art the stone, the desert,
Thou art death!"

The serpent symbolism of the Last Supper is explained by the identification of the hero with the serpent The god is buried in the mother, as fruit of the field, as food coming from the mother and at the same time as drink of immortality he is received by the mystic, or as a serpent he unites with the mystic All these symbols represent the liberation of the libido from the incestuous fixation through which new life is attained. The liberation is accomplished under symbols, which represent the activity of the incest wish

It might be justifiable at this place to cast a glance upon psychoanalysis as a method of treatment In practical analysis it is important, first of all, to discover the libido lost from the control of consciousness (It often happens to the libido as with the fish of Moses in the Mohammedan legend, it sometimes "takes its course in a marvellous manner into the sea") Freud says in his important article, "Zur Dynamik der Übtertragung".[133]

"The libido has retreated into regression and again revives the infantile images"

This means, mythologically, that the sun is devoured by the serpent of the night, the treasure is concealed and guarded by the dragon substitution of a present mode of adaptation by an infantile mode, which is represented by the corresponding neurotic symptoms Freud continues

"Thither the analytic treatment follows it and endeavours to seek out the libido again, to render it accessible to consciousness, and finally to make it serviceable *to reality Whenever the analytic investigation touches upon* the libido, withdrawn into its hiding-place, a struggle must break out, all the forces, which have caused the regression of the libido, will rise up as resistance against the work, in order to preserve this new condition"

Mythologically this means, the hero seeks the lost sun, the fire, the virgin sacrifice, or the treasure, and fights the typical fight with the dragon, with the libido in resistance As these parallels show, psychoanalysis mobiles a part of the life processes, the fundamental importance of which properly illustrates the significance of this process

After Siegfried has slain the dragon, he meets the father, Wotan, plagued by gloomy cares, for the primitive mother, Erda, has placed in his path the snake, in order to enfeeble his sun He says to Erda:

Wanderer
All-wise one
Care's piercing sting by thee was planted
In Wotan's dauntless heart
With fear of shameful ruin and downfall

Filled was his spirit by tidings
Thou didst foretell
Art thou the world's wisest of women ?
Tell to me now
How a god may conquer his care

Erda

Thou art not
What thou hast said

It is the same primitive motive which we meet in Wagner the mother has robbed her son, the sun-god, of the joy of life, through a poisonous thorn, and deprives him of his power, which is connected with the name. Isis demands the name of the god, Erda says, "Thou art not what thou hast said" But the "Wanderer" has found the way to conquer the fatal charm of the mother, the fear of death :

"The eternals downfall
No more dismays me,
Since their doom I willed

"I leave to thee, loveliest Wälsung,
Gladly my heritage now
To the ever-young
In gladness yieldeth the god!"

These wise words contain, in fact, the saving thought It is not the mother who has placed the poisonous worm in our path but our libido itself wills to complete the course of the sun to mount from morn to noon, and, passing beyond noon, to hasten towards evening, not at war with itself, but willing the descent and the end [104]

Nietzsche's Zarathustra teaches

"I praise thee, my death, the free death, which comes to me because I want it

"And when shall I want it ?

"He who has a goal and an heir wants death at the proper time for his goal and his heir

"And this is the great noonday, when man in the middle of his course stands between man and superman, and celebrates his path towards evening as his highest hope because it is the path to a new morning

"He who is setting will bless his own going down because it is a transition and the sun of his knowledge will be at high noon"

Siegfried conquers the father Wotan and takes possession of Brunhilde The first object that he sees is her horse ; then he believes that he beholds a mail clad man He cuts to pieces the protecting coat of mail of the sleeper. (Overpowering) When he sees it is a woman terror seizes him .

"My heart doth falter and faint ;
On whom shall I call
That he may help me ?
Mother ! Mother !
Remember me !

"Can this be fearing?
Oh, Mother! Mother!
Thy dauntless child!
A woman lieth asleep —
And she now has taught him to fear!

"Awaken! Awaken!
Holiest maid!
Then life from the sweetness of lips
Will I win me—
E'en tho' I die in a kiss"

In the duet which follows the mother is invoked:

"O mother, hail!
Who gave thee thy birth!"

The confession of Brunhilde is especially characteristic:

"O knewest thou—joy of the world,
How I have ever loved thee!
Thou wert my gladness,
My care wert thou!
Thy life I sheltered;
Or ere it was thine,
Or ere thou wert born,
My shield was thy guard" [135]

The pre-existence of the hero and the pre-existence of Brunhilde as his wife-mother are clearly indicated from this passage Siegfried says in confirmation

"Then death took not my mother?
Bound in sleep did she lie?"

The mother-imago, which is the symbol of the dying and resurrected libido, is explained by Brunhilde to the hero, as his own will:

"Thyself am I
If blest I be in thy love"

The great mystery of the Logos entering into the mother for rebirth is proclaimed with the following words by Brunhilde:

"O Siegfried, Siegfried,
Conquering light!
I loved thee ever,
For I divined
The thought that Wotan had hidden—
The thought that I dared
Not to whisper— [136]
That all unclearly
Glowed in my bosom
Suffered and strove,
Foe which I flouted
Him, who conceived it [136]
For which in penance
Prisoned I lay,
While thinking it not

> And feeling only,
> For, in my thought
> Oh, should you seek it!
> Was only my love for thee."

The erotic similes which now follow distinctly reveal the motive of re-birth

> *Siegfried:*
> "A glorious flood
> Before me rolls
> With all my senses
> I only see
> Its buoyant gladdening billows
> Though in the deep
> I find not my face
> Burning, I long
> For the water's balm;
> And now as I am
> Spring in the stream[127]
> O might its billows
> Engulf me in bliss."

The motive of plunging into the maternal water of rebirth (baptism) is here fully developed. An allusion to the "terrible mother" imago, the mother of heroes, who teaches them fear, is to be found in Brunhilde's words (the horse woman, who guides the dead to the other side):

> "Fearest thou, Siegfried?
> Fearest thou not
> The wild, furious woman?"

The orgiastic "Occide moriturus" resounds in Brunhilde's words

> "Laughing let us be lost—
> Laughing go down to death!"

And in the words

> "Light giving love
> Laughing death!"

is to be found the same significant contrast.

The further destinies of Siegfried are those of the Invictus. The spear of the gloomy, one-eyed Hagen strikes Siegfried's vulnerable spot. The old sun, who has become the god of death, the one-eyed Wotan, smites his offspring, and once again ascends in eternal rejuvenation. The course of the invincible sun has supplied the mystery of human life with beautiful and imperishable symbols; it became a comforting fulfilment of all the yearning for immortality, of all desire of mortals for eternal life.

Man leaves the mother, the source of libido, and is driven by the eternal thirst to find her again, and to drink renewal from her; thus he completes his cycle, and returns again into the mother's womb. Every obstacle which obstructs his life's path, and threatens

his ascent, wears the shadowy features of the "terrible mother," who paralyses his energy with the consuming poison of the stealthy, retrospective longing. In each conquest he wins again the smiling love and life-giving mother—images which belong to the intuitive depths of human feeling, the features of which have become mutilated and irrecognisable through the progressive development of the surface of the human mind. The stern necessity of adaptation works ceaselessly to obliterate the last traces of these primitive landmarks of the period of the origin of the human mind, and to replace them along lines which are to denote more and more clearly the nature of real objects.

CHAPTER VIII

THE SACRIFICE

AFTER this long digression, let us return to Miss Miller's vision. We can now answer the question as to the significance of Siegfried's longing for Brunhilde. It is the striving of the libido away *from the mother towards the mother.* This paradoxical sentence may be translated as follows: as long as the libido is satisfied merely with phantasies, it moves in itself, in its own depths, in the mother.[1] When the longing of our author rises in order to escape the magic circle of the incestuous and, therefore, pernicious, object, and it does not succeed in finding reality, then the object is and remains irrevocably the mother. Only the overcoming of the obstacles of reality brings the deliverance from the mother, who is the continuous and inexhaustible source of life for the creator, but death for the cowardly, timid and sluggish.

Whoever is acquainted with psychoanalysis knows how often neurotics cry out against their parents. To be sure, such complaints and reproaches are often justified on account of the common human imperfections, but still more often they are reproaches which should really be directed towards themselves. Reproach and hatred are always futile attempts to free one's self apparently from the parents, but in reality from one's own hindering longing for the parents. Our author proclaims through the mouth of her infantile hero Chiwantopel a series of insults against her own family. We can assume that she must renounce all these tendencies, because they contain an unrecognised wish. This hero, of many words, who performs few deeds and indulges in futile yearnings, is the libido which has not fulfilled its destiny, but which turns round and round in the kingdom of the mother, and, in spite of all its longing, accomplishes nothing. Only he can break this magic circle who possesses the courage of the will to live and the heroism to carry it through. Could this yearning hero-youth, Chiwantopel, but put an end to his existence, he would probably rise again in the form of a brave man seeking real life. This necessity imposes itself upon the dreamer as a wise counsel and hint of the unconscious in the following monologue of Chiwantopel. He cries sadly:

"In all the world, there is not a single one! I have sought among a hundred tribes. I have watched a hundred moons, since I began. Can it be that there is not a solitary being who will ever know my soul? Yes, by the sovereign

God, yes! But ten thousand moons will wax and wane before that pure soul is born And it is from another world that her parents will come to this one She will have pale skin and pale locks She will know sorrow before her mother bears her Suffering will accompany her, she will seek also, and she will find, no one who understands her Temptation will often assail her soul—but she will not yield. In her dreams, I will come to her, and she will understand *I have kept my body inviolate* I have com ten thousand moons before her epoch, and she will come ten thousand moons too late But she will understand! There is only once in all the ten thousand moons that a soul like hers is born"

Thereupon a green *serpent darts from the bushes, glides towards him and stings him on the arm, then attacks the horse, which succumbs first* Then Chiwantopel says to his horse

"'Adieu, faithful brother! Enter into rest! I have loved you, and you have served me well Adieu Soon I will rejoin you!' Then to the snake 'Thanks, little sister, you have *put an end to my wanderings*'"

Then he cried with grief and spoke his prayer

"'Sovereign God, take me soon! I have tried to know thee, and to keep thy law! *O, do not suffer my body to fall into corruption and decay*, and to furnish the vultures with food!' A smoking crater is perceived at a distance, the rumbling of an earthquake is heard, followed by a trembling of the ground"

Chiwantopel cries in the delirium of suffering, while the earth covers his body.

"I have kept my body inviolate. Ah! She understands Ja-ni-wa-ma, Ja-ni-wa-ma, thou who comprehendeth me"

Chiwantopel's prophecy is a repetition of Longfellow's "Hiawatha," where the poet could not escape sentimentality, and at the close of the career of the hero, Hiawatha, he brings in the Savior of the white people, in the guise of the arriving illustrious representatives of the Christian religion and morals (One thinks of the work of redemption of the Spaniards in Mexico and Peru!) With this prophecy of Chiwantopel, the personality of the author is again placed in the closest relation to the hero, and, indeed, as the real object of Chiwantopel's longing Most certainly the hero would have married her, had she lived at his time; but, unfortunately, she comes too late The connection proves our previous assertion that the libido moves round in a circle The author loves herself, that is to say, she, as the hero, is sought by one who comes too late This motive of coming too late is characteristic of the infantile love. the father and the mother cannot be overtaken The separation of the two personalities by ten thousand moons is a wish fulfilment; with that the incest relation is annulled in an effectual manner. This white heroine will seek without being understood (She is not understood, because she cannot understand herself rightly) And she will not find But in dreams, at least, they will find each other, "and she will understand" The next sentence of the text reads

"I have kept my body inviolate"

This proud sentence, which naturally only a woman can express, because man is not accustomed to boast in that direction, again confirms the fact that all enterprises have remained but dreams, that the body has remained "inviolate." When the hero visits the heroine in a dream, it is clear what is meant. This assertion of the hero's, that he has remained inviolate, refers back to the unsuccessful attempt upon his life in the previous chapter (huntsman with the arrow), and clearly explains to us what was really meant by this assault; that is to say, the refusal of the coitus phantasy. Here the wish of the unconscious obtrudes itself again, after the hero had expressed it the first time, and thereupon he painfully and hysterically utters this monologue: "Temptation will often assail her soul—but it will not yield." This very bold assertion reduces—noblesse oblige—the unconscious to an enormous infantile megalomania, which is always the case when the libido is compelled, through similar circumstances, to regressions. "Only once in all the ten thousand moons is a soul born like mine!" Here the unconscious ego expands to an enormous degree, evidently in order to cover with its boastfulness a large part of the neglected duty of life. But punishment follows at its heels. Whoever prides himself too much on having sustained no wound in the battle of life lays himself open to the suspicion that his fighting has been with words only, whilst actually he has remained far away from the firing line. This spirit is just the reverse of the pride of those savage women, who point with satisfaction to the countless scars which were given them by their men in the sexual fight for supremacy. In accordance with this, and in logical continuation of the same, all that follows is expressed in figurative speech. The orgiastic "Occide moriturus" in its admixture with the reckless laughter of the Dionysian frenzy confronts us here in sorry disguise with a sentimental stage trickery worthy of our posthumous edition of "Christian morals." In place of the positive phallus, the negative appears, and leads the hero's horse (his libido animalis), not to satisfaction, but into eternal peace—also the fate of the hero. This end means that the mother, represented as the jaws of death, devours the libido of the daughter. Therefore, instead of life and procreative growth, only phantastic self-oblivion results. This weak and inglorious end has no elevating or illuminating meaning so long as we consider it merely as the solution of an individual erotic conflict. The fact that the symbols under which the solution takes place have actually a significant aspect, reveals to us that behind the individual mask, behind the veil of "individuation," a primitive idea stands, the severe and serious features of which take from us the courage to consider the sexual meaning of the Miller symbolism as all-sufficient.

It is not to be forgotten that the *sexual phantasies of the neurotic and the exquisite sexual language of dreams* are regressive phenomena. The sexuality of the unconsious is not what it seems to be; *it is merely a symbol*; it is a thought bright as day, clear as sunlight, a

decision, a step forward to every goal of life—but expressed in the unreal sexual language of the unconscious, and in the thought form of an earlier stage, a resurrection, so to speak, of earlier modes of adaptation. When, therefore, the unconscious pushes into the foreground the coitus wish, negatively expressed, it means somewhat as follows: under similar circumstances primitive man acted in such and such a manner. The mode of adaptation which to-day is unconscious for us is carried on by the savage Negro of the present day, whose undertakings beyond those of nutrition appertain to sexuality, characterised by violence and cruelty. Therefore, in view of the archaic mode of expression of the Miller phantasy, we are justified in assuming the correctness of our interpretation for the lowest and nearest plane only. A deeper stratum of meaning underlies the earlier assertion that the figure of Chiwantopel has the character of Cassius, who has a lamb as a companion. Therefore, Chiwantopel is the portion of the dreamer's libido bound up with the mother (and, therefore, masculine), hence he is her infantile personality, the childishness of character, which as yet is unable to understand that one must leave father and mother, when the time is come, in order to serve the destiny of the entire personality. This is outlined in Nietzsche's words:

> "Free dost thou call thyself? Thy dominant thought would I hear and not that thou hast thrown off a yoke. Art thou one who had the right to throw off a yoke? There are many who throw away their last value when they throw away their servitude."

Therefore, when Chiwantopel dies, it means that herein is a fulfilment of a wish, that this infantile hero, who cannot leave the mother's care, may die. And if with that the bond between mother and daughter is severed, a great step forward is gained both for inner and outer freedom. But man wishes to remain a child too long; he would fain stop the turning of the wheel, which, rolling, bears along with it the years; man wishes to keep his childhood and eternal youth, rather than to die and suffer corruption in the grave. ("O do not suffer my body to fall into decay and corruption.") Nothing brings the relentless flight of time and the cruel perishability of all blossoms more painfully to our consciousness than an inactive and empty life. *Idle dreaming is the mother of the fear of death*, the sentimental deploring of what has been and the vain turning back of the clock. Although man can forget in the long-(perhaps too long) guarded feelings of youth, in the dreamy state of stubbornly held remembrances, that the wheel rolls onward, nevertheless mercilessly does the gray hair, the relaxation of the skin and the wrinkles in the face tell us, that whether or not we expose the body to the destroying powers of the whole struggle of life, the poison of the stealthily creeping serpent of time consumes our bodies, which, alas! we so dearly love. Nor does it help if we cry out with the melancholy hero Chiwantopel, "I have kept my body

inviolate"; flight from life does not free us from the law of age and death. The neurotic who seeks to get rid of the necessities of life wins nothing and lays upon himself the frightful burden of a premature age and death, which must appear especially cruel on account of the total emptiness and meaninglessness of his life. If the libido is not permitted to follow the progressive life, which is willing to accept all dangers and all losses, then it follows the other road, sinking into its own depths, working down into the old foreboding regarding the immortality of all life, to the longing for rebirth.

Holderlin exemplifies this path in his poetry and his life. I leave the poet to speak in his song:

To the Rose

"In the mother-womb eternal,
Sweetest queen of every field,
Still the living and supernal
Nature carries thee and me.

"Little rose, the storm's fierce power
Strips our leaves and alters us,
Yet the deathless germ will tower
To new blooms, miraculous."

The following comments may be made upon the parable of this poem: The rose is the symbol of the beloved woman ("Haidenroslein," heather rose of Goethe). The rose blooms in the "rose-garden" of the maiden; therefore, it is also a direct symbol of the libido. When the poet dreams that he is with the rose in the mother-womb of nature, then, psychologically, the fact is that his libido is with the mother. Here is an eternal germination and renewal. We have come across this motive already in the Hierosgamos hymn (Iliad XIV); The nuptials in the blessed West; that is to say, the union in and with the mother. Plutarch shows us this motive in naïve form in his tradition of the Osiris myth; Osiris and Isis copulating in the mother's womb. This is also perceived by Holderlin as the enviable prerogative of the gods—to enjoy everlasting infancy. Thus, in Hyperion, he says:

Fateless, like the sleeping nursling,
Breathe the Heavenly ones;
Chastely guarded in modest buds,
Their spirits blossom eternally,
And their quiet eyes
Gaze out in placid
Eternal serenity."

This quotation shows the meaning of heavenly bliss. Holderlin never was able to forget this first and greatest happiness, the dreamy picture of which estranged him from real life. Moreover, in this poem, the ancient *motive of the twins* in the mother's womb is intimated. (Isis and Osiris in the mother's womb.) The motive is archaic. There is a legend in Frobenius of how the great serpent

(appearing from the little serpent in the hollow tree, through the so-called stretching out of the serpent) has finally devoured all men (devouring mother—death), and only a pregnant woman remains alive, she digs a ditch, covers it with a stone (grave—mother's womb), and, living there, she gives birth to twins, the subsequent dragon-killers (the hero in double form, man and phallus, man and woman, man with his libido, the dying and rising sun)

This existence together in the mother is to be found also very beautifully expressed in an African myth (Frobenius)

"In the beginning, Obatala, the heaven, and Odudua, the earth, his wife, lay pressed firmly together in a calabas"

The guarding "in a modest bud" is an idea which has appeared already in Plutarch, where it is said that the sun was born in the morning from a flower bud Brahma, too, comes from the bud, which also gave birth in Assam to the first human pair

Humanity

(An unfinished poem)

"Scarcely sprouted from the waters, O Earth,
Are thy old mountain tops and diffuse odors,
While the first green islands, full of young woods, breathe delight
Through the May air over the Ocean

"And joyfully the eye of the Sun-god looked down
Upon the firstlings of the trees and flowers,
Laughing children of his youth, born from thee;
When on the fairest of the islands

Once lay thy most beautiful child under the grapes!
Lay after a mild night, in the dawn,
In the daybreak a child born to thee, O Earth!
And the boy looks up familiarly
To his Father, Helios,
And, tasting the sweet grapes,
He picked the sacred vine for his nurse,
And soon he is grown, the beasts
Fear him, for he is different from them
This man, he is not like thee, the father
For the lofty soul of the father,
Is in him boldly united with thy pleasures,
And thy sadness, O Earth,
He may resemble the eternal Nature,
The mother of Gods, the terrible Mother.

"Ah! therefore, O Earth,
His presumption drives him away from thy breast,
And thy gifts are vain, the tender ones,
Ever and ever too high does the proud heart beat

"Out from the sweet meadow of his shores
Man must go into the flowerless waters,
And tho' his groves shine with golden fruit,
Like the starry night, yet he digs,

He digs ores in the mountains and seeks in the mines,
Far from the sacred rays of his father,
Faithless also to the sun god,
Who does not love weaklings, and mocks at cares

" Ah ! freer do the birds of the wood breathe
Although the breast of man heaves wilder and more proudly,
His pride becomes fear, and the tender flowers
Of his peace do not bloom for him,

This poem betrays to us the beginning of the discord between the poet and nature, he begins to be estranged from reality, the natural actual existence It is a remarkable idea how the little child chooses " the vine for his nurse " This Dionysian allusion is very old In the significant blessing of Jacob it is said of Judah (Genesis, chap xlix, verse 11),

" Binding his foal unto the vine, and his ass's colt unto the choice vine "

A Gnostic gem has been preserved upon which there is a representation of an ass suckling her foal, above which is the symbol of Cancer, and the circumscription D N I H Y X P S Dominus Noster Jesus Christus, with the supplement Dei filius As Justinus Martyr indignantly observes, the connections of the Christian legend with that of Dionysus are unmistakable (Compare, for example, the miracle of the wine) In the last-named legend the ass plays an important rôle Generally speaking, the ass has an entirely different meaning in the Mediterranean countries than with us—an economic one Therefore, it is a benediction when Jacob says (Genesis, chap xlix, verse 14)

" Issachar is a strong ass couching down between two burdens "

The above-mentioned thought is altogether Oriental Just as in Egypt the new-born sun is a bull-calf, in the rest of the Orient it can easily be an ass's foal, to whom the vine is the nurse Hence the picture in the blessing of Jacob, where it is said of Judah .

" His eyes are ruddy with wine and his teeth white with milk "

The mock crucifix of the Palatine, with an ass's head, evidently alludes to a very significant background

To Nature

" While about thy veil I lingered, playing,
And, like any bud, upon thee hung,[2]
Still I felt thy heart in every straying
Sound about my heart that shook and clung.
While I groped with faith and painful yearning,
To your picture, glowing and unfurled,
Still I found a place for all my burning
Tears, and for my love I found a world !

"To the Sun my heart, before all others,
Turned and felt its potent magicry,
And it called the stars its little brothers[3]
And it called the Spring, God's melody,
And each breeze in groves or woodlands fruits
Held thy spirit—and that same sweet joy
Moved the well-springs of my heart with beauty—
Those were golden days without alloy

"Where the Spring is cool in every valley,[4]
And the youngest bush and twig is green,
And about the rocks the grasses rally,
And the branches show the sky between,
There I lay, imbibing every flower
In a rapt, intoxicated glee,
And, surrounded by a golden shower,
From their heights the clouds sank down to me[5]

"Often, as a weary, wandering river
Longs to join the ocean's placid mirth,
I have wept and lost myself forever
In the fulness of thy love, O Earth!
Then—with all the ardor of my being—
Forth I rushed from Time's slow apathy,
Like a pilgrim home from travel, fleeing
To the arms of rapt Eternity

"*Blessed be childhood's dreams, their power*
Hid from me Life's dismal poverty
All the heart's rich germs ye brought to flower;
Things I could not reach, ye gave to me![6]
In thy beauty and thy light, O Nature
Free from care and from compulsion free,
Fruitful Love attained a kingly stature,
Rich as harvests reaped in Arcady.

"That which brought me up, is dead and riven,
Dead the youthful world which was my shield
And this breast, which used to harbor heaven,
Dead and dry as any stubble-field
Still my Springlike sorrows sing and cover
With their friendly comfort every smart—
But the morning of my life is over
And the Spring has faded from my heart . . .

"Shadows are the things that once we cherished;
Love itself must fade and cannot bide,
Since the golden dreams of youth have perished,
Even friendly Nature's self has died
Heart, poor heart, those days could never show it—
How far-off thy home, and where it lies . .
Now alas, thou nevermore wilt know it
If a dream of it does not suffice"

Palinodia

"What gathers about me, Earth, in your dusky, friendly green?
What are you blowing towards me, Winds, what do you bring again?
There is a rustling in all the tree-tops . . .

. . . .

"Why do you wake me, my soul?
Why do ye stir in me the past, ye kind lords?
Oh, spare me and let them rest, oh do not mock
Those ashes of my joy.

"O change your changes, ye gods—
And grow in your youth over the old ones;
And if you would be akin to the mortals—
The young girls will blossom for you
And the young heroes will shine;
And sweeter than ever
Morning will play upon the cheeks of the happy ones;
And ravishingly sweet you will hear
The songs of those who are without care. . . .

"Ah, once the living waves of song
Surged out of every bush to me;
And still the heavenly ones gleam down upon me,
Their eyes shining with joy.

. .

The separation from the blessedness of childhood, from youth even, has taken the golden glamour from nature, and the future is hopeless emptiness. But what robs nature of its glamour, and life of its joy, is the poison of the retrospective longing, which harks back, in order to sink into its own depths.

Empedocles

"Thou seekest life—and a godly fire springs out to thee,
Gushing and gleaming from the deeps of the earth;
And, with shuddering longing,
Throws thee down into the flames of Aetna.

"So, through a queen's wanton whim,
Pearls are dissolved in wine—restrain her not!
Didst thou not throw thy riches, Poet,
Into the bright and bubbling cup!

"Still thou art holy to me, as the Power of Earth
Which took thee away, lovely assassin!
And I would have followed the hero to the depths,
Had Love not held me."

This poem betrays the secret longing for the maternal depths.[7]
He would like to be sacrificed in the chalice, dissolved in wine like pearls (the "crater" of rebirth), yet love holds him within the light of day. The libido still has an object, for the sake of which life is worth living. But were this object abandoned, then the libido would sink into the realm of the subterranean, the mother, who brings forth again.

Obituary

(Unfinished poem.)

"Daily I go a different path
Sometimes into the green wood, sometimes to the bath in the spring
Or to the rocks where the roses bloom
From the top of the hill I look over the land,

Yet nowhere, thou lovely one, nowhere in the light do I find thee;
And in the breezes my words die away,
The sacred words which once we had

"Aye, thou art far away, O holy countenance!
And the melody of thy life is kept from me,
No longer overheard And, ah, where are
Thy magic songs which once soothed my heart
With the peace of heaven?
How long it is, how long!
The youth is aged, the very earth itself, which once smiled on me,
Has grown different

"Oh, farewell! The soul of every day departs, and, departing, turns to thee—
And over thee there weeps
The eye that, becoming brighter,
Looks down,
There where thou tarriest"

This distinctly suggests a renunciation, an envy of one's own youth, that time of freedom which one would like to retain through a deep rooted dislike to all duty and endeavor which is denied an immediate pleasure reward. Painstaking work for a long time and for a remote object is not in the nature of child or primitive man It is difficult to say if this can really be called laziness, but it seems to have not a little in common with it, in so far as the psychic life on a primitive stage, be it of an infantile or archaic type, possesses an extreme inertia and irresponsibility in production and non-production

The last stanza portends evil, a gazing towards the other land, the distant coast of sunrise or sunset, love no longer holds the poet, the bonds with the world are torn and he calls loudly for assistance to the mother:

Achilles

"Lordly son of the Gods! Because you lost your loved one,
You went to the rocky coast and cried aloud to the flood,
Till the depths of the holy abyss heard and echoed your grief
From the far reaches of your heart Down, deep down, far from the clamour of ships
Deep under the waves, in a peaceful cave,
Dwelt the beautiful Thetis, she who protected you, the Goddess of the Sea,
Mother of the youth was she, the powerful Goddess,
She who once had lovingly nursed him,
On the rocky shore of his island, she who had made him a hero
With the might of her strengthening bath and the powerful song of the waves
And the mother, mourning, hearkened to the cry of her child,
And rose, like a cloud, from the bed of the sea,
Soothing with tender embraces the pains of her darling,
And he listened, while she, caressing, promised to soften his grief

"Son of the Gods! Oh, were I like you, then could I confidently
Call on the Heavenly Ones to hearken to my secret grief
But never shall I see this—I shall bear the disgrace
As if I never belonged to her, even though she thinks of me with tears

Remember me! And yet Ye know, the [illegible] men
Ah, how rapt and fervently I worshipped you, holy heart,
Since I have lived, the Earth and its fountains and woodlands
Father Ether—and my heart has felt you about me so ardent and
pure—
Oh, soften my sorrows, ye Kind Ones,
That my soul may not be silenced, may not be struck dumb too
early,
That I may live and thank Ye, O Heavenly Powers
With joyful songs through all the hurrying days
Thank ye for gifts of the past, for the joys of vanished Youth—
And then, pray take me, the lonely one,
Graciously, unto yourselves."

These poems describe more plainly than could be depicted with meagre words the persistent arrest and the constantly growing estrangement from life, the gradual deep immersion into the maternal abyss of the individual being. The apocalyptic song of Patmos is strangely related to these songs of retrogressive longing. It enters as a dismal guest surrounded by the mist of the depths, the gathering clouds of insanity, bred through the mother. In it the primitive thoughts of the myth, the suggestion clad in symbols, of the sun-like death and resurrection of life, again burst forth. Similar things are to be found in abundance among sick people of this sort.

I reproduce some significant fragments from Patmos.

"Near is the God
And hard to comprehend,
But where Danger threatens
The Rescuer appears."

These words mean that the libido has now sunk to the lowest depths, where "the danger is great" (Faust, Part II, Mother scene). There "the God is near"; there man may find the inner sun, his own nature, sunlike and self-renewing, hidden in the mother-womb like the sun in the night time.

" In Chasms
And in darkness dwell
The eagles; and fresh and fearlessly
The Sons of the Alps pass swiftly over the abyss
Upon lightly swinging bridges."

With these words the dark phantastic poem passes on. The eagle, the bird of the sun, dwells in darkness—the libido has hidden itself, but high above it the inhabitants of the mountains pass, probably the gods ("Ye are walking above in the light"), symbols of the sun wandering across the sky, like the eagle flying over the depths.

" Above and around are reared
The summits of Time,
And the loved ones, though near,
Live on deeply separated mountains
So give us waters of innocence,
And give us wings of true understanding,
With which to pass across and to return again,"

The first is a gloomy picture of the mountains and of time—although caused by the sun wandering over the mountains, the following pictures a nearness, and at the same time separation, of the lovers, and seems to hint at life in the underworld,[8] where he is united with all that once was dear to him, and yet cannot enjoy the happiness of reunion, because it is all shadows and unreal and devoid of life. Here the one who descends drinks the waters of innocence, the waters of childhood, the drink of rejuvenation,[9] so wings may grow, and, winged, he may soar up again into life, like the winged sun, which arises like a swan from the water ("Wings, to pass across and to return again")

" So I spoke, and lo, a genie
Carried me off, swifter than I had imagined,
And farther than ever I had thought
From my own house!
It grew dark
As I went in the twilight
The shadowy wood,
And the yearning brooks of my home-land
Grew vague behind me—
And I knew the country no longer "

After the dark and obscure words of the introduction, wherein the poet expresses the prophecy of what is to come, the sun journey begins ("night journey in the sea") towards the east, towards the ascent, towards the mystery of eternity and rebirth, of which Nietzsche also dreams, and which he expressed in significant words:

"Oh, how could I not be ardent for eternity, and for the nuptial ring of rings—the ring of the return! Never yet have I found the woman from whom I wish children, unless she would be this woman whom I love, for I love thee, O eternity"

Holderlin expresses this same longing in a beautiful symbol, the individual traits of which are already familiar to us:

" But soon in a fresh radiance
Mysteriously
Blossoming in golden smoke,
With the rapidly growing steps of the sun,
Making a thousand summits fragrant,
Asia arose!
And, dazzled,
I sought one whom I knew,
For unfamiliar to me were the broad roads,
Where from Tmolus
Comes the gilded Pactol,
And Taurus stands and Messagis—
And the gardens are full of flowers
But high up in the light
The silvery snow gleams, a silent fire;
And, as a symbol of eternal life,
On the impassable walls,
Grows the ancient ivy[10]
And carried by columns of living cedars and laurels
Are the solemn, divinely built palaces"

The symbol is apocalyptic: the maternal city in the land of eternal youth, surrounded by the verdure and flowers of imperishable spring.[11] The poet identifies himself here with John, who lived on Patmos, who was once associated with "the sun of the Highest," and saw him face to face:

"There at the Mystery of the Vine they met,
There at the hour of the Holy Feast they gathered,
And feeling the approach of Death in his great, quiet soul
The Lord, pouring out his last love, spoke,
And then he died.
Much could be said of it—
How his triumphant glance,
The happiest of all,
Was seen by his companions, even at the last.

. . . . .

Therefore he sent the Spirit unto them,
And the horse trembled solemnly
And, with distant thunder,
The storm of God rolled over the cowering heads
Where, deep in thought,
The heroes of death were assembled. . .
Now, when he, in parting,
Appeared once more before them,
Then the kingly day, the day of the sun, was put out,
And the gleaming sceptre, formed of his rays,
Was broken—and suffered like a god itself.
Yet it shall return and glow again
When the right time comes."

The fundamental pictures are the sacrificial death and the resurrection of Christ, like the self-sacrifice of the sun, which voluntarily breaks its sceptre, the fructifying rays, in the certain hope of resurrection. The following comments are to be noted in regard to "the sceptre of rays"; Spielrein's patient says, "God pierces through the earth with his rays." The earth, in the patient's mind, has the meaning of woman. She also comprehends the sunbeam in mythologic fashion as something solid: "Jesus Christ has shown me his love, by striking against the window with a sunbeam." Among other insane patients I have come across the same idea of the solid substance of the sunbeam. Here there is also a hint of the phallic nature of the instrument which is associated with the hero. Thor's hammer, which, cleaving the earth, penetrates deeply into it, may be compared to the foot of Kaineus. The hammer is retained in the interior of the earth, like the treasure, and, in the course of time, it gradually comes again to the surface ("the treasure blooms"), meaning that it was born again from the earth. (Compare what has been said concerning the etymology of "swelling.") On many monuments Mithra holds a peculiar object in his hands, which Cumont compares to a half-filled tube. Dieterich proves from his papyrus text that the object is the shoulder of the bull, the bear constellation. The shoulder has an indirect phallic meaning, for it is the part which is wanting in Pelops. Pelops was slaughtered by

his father, Tantalus, dismembered, and boiled in a kettle, to make a meal for the gods. Demeter had unsuspectingly eaten the shoulder from this feast, when Zeus discovered the outrage. He had the pieces thrown back into the kettle, and, with the help of the life-dispensing Clotho, Pelops was regenerated, and the shoulder which was missing was replaced by an ivory one. This substitution is a close parallel to the substitution of the missing phallus of Osiris. Mithra is represented in a special ceremony, holding the bull's shoulder over Sol, his son and vice-regent. This scene may be compared to a sort of dedication, or accolade (something like the ceremony of confirmation). The blow of the hammer as a generating, fructifying, inspiring function is retained as a folk-custom and expressed by striking with the twig of life, which has the significance of a charm of fertility. In the neuroses, the sexual meaning of castigation plays an important part, for among many children castigation may elicit a sexual orgasm. The ritual act of striking has the same significance of generating (fructifying), and is, indeed, merely a variant of the original phallic ceremonial. Of similar character to the bull's shoulder is the cloven hoof of the devil, to which a sexual meaning also appertains. The ass's jawbone wielded by Samson has the same worth. In the Polynesian Maui myth the jawbone, the weapon of the hero, is derived from the man-eating woman, Muriranga-whenua, whose body swells up enormously from lusting for human flesh (Frobenius). Hercules' club is made from the wood of the maternal olive tree. Faust's key also "knows the mothers." The libido springs from the mother, and with this weapon alone can man overcome death.

It corresponds to the phallic nature of the ass's jawbone, that at the place where Samson threw it God caused a spring to gush forth[12] (springs from the horse's tread, footsteps, horse's hoof.) To this relation of meanings belongs the magic wand, the sceptre in general. Σκῆπτρον belongs to *σκᾶπος*, *σκηπάνων*, *σκήπων* = staff, *σκηπτός* = storm-wind, Latin *scapus*=shaft, stock, scapula, shoulder, Old High German *Schaft*=spear, lance.[13] We meet once more in this compilation those connections which are already well known to us. Sun-phallus as tube of the winds, lance and shoulder-blade.

The passage from Asia through Patmos to the Christian mysteries in the poem of Holderlin is apparently a superficial connection, but in reality a very ingenious train of thought, namely, the entrance into death and the land beyond as a self-sacrifice of the hero, for the attainment of immortality. At this time, when the sun has set, when love is apparently dead, man awaits in mysterious joy the renewal of all life:

> ". . . And Joy it was
> From now on
> To live in the loving night and see
> The eyes of innocence hold the unchanging
> Depths of all wisdom."

Wisdom dwells in the depths, the wisdom of the mother; being one with it, insight is obtained into the meaning of deeper things, into all the deposits of primitive times, the strata of which have been preserved in the soul. Hölderlin, in his diseased ecstasy, feels once more the greatness of the things seen, but he does not care to bring up to the light of day that which he had found in the depths —in this he differs from Faust:

> " And it is not an evil, if a few
> Are lost and never found, and if the speech
> Conceals the living sound
> Because each godly work resembles ours.
> And yet the Highest does not plan it all—
> The great pit bears [illegible],
> And the glowing lava of Aetna.
> Would I had the power
> To build an image and see the Spirit—
> See it as it was!"

He allows only one hope to glimmer through, formed in scanty words:

> " He wakes the dead
> They who are not enchained and bound,
> They who are not unwrought.
> And if the Heavenly ones
> Now, as I believe, love me—
> Silent is his sign[14]
> In the dusky sky. And one stands under it
> His whole life long—for Christ still lives."

But, as once Gilgamesh, bringing back the magic herb from the west land, was robbed of his treasure by the demon serpent, so does Holderlin's poem die away in a painful lament, which betrays to us that no victorious resurrection will follow his descent to the shadows:

> " Ignominiously
> A power tears our heart away,
> For sacrifices the heavenly ones demand."

This recognition, that man must sacrifice the retrogressive longing (the incestuous libido) before the "heavenly ones" tear away the sacrifice, and at the same time the entire libido, came too late to the poet. Therefore, I take it to be a wise counsel which the unconscious gives our author, to sacrifice the infantile hero. This sacrifice is best accomplished, as is shown by the most obvious meaning, through a complete devotion to life, in which all the libido unconsciously bound up in familial bonds, must be brought outside into human contact. For it is necessary for the well-being of the adult individual, who in his childhood was merely an atom revolving in a rotary system, to become himself the centre of a new system. That such a step implies the solution or, at least, the energetic treatment of the individual sexual problem is obvious, for unless this is done the unemployed libido will inexorably remain fixed in the incestuous

bond, and will prevent individual freedom in essential matters Let us keep in mind that Christ's teaching separates man from his family without consideration, and in the talk with Nicodemus we saw the specific endeavour of Christ to procure activation of the incest libido Both tendencies serve the same goal—the liberation of man, the Jew from his extraordinary fixation to the family, which does not imply higher development, but greater weakness and more uncontrolled incestuous feeling, produced the compensation of the compulsory ceremonial of the cult and the religious fear of the incomprehensible Jehovah When man, terrified by no laws and no furious fanatics or prophets, allows his incestuous libido full play, and does not liberate it for higher purposes, then he is under the influence of unconscious compulsion For compulsion is the unconscious wish (Freud) He is under the dominance of the libido εἱμαρμένη* and his destiny does not lie in his own hands, his adventures, Τύχαι καὶ Μοῖραι,† fall from the stars His unconscious incestuous libido, which thus is applied in its most primitive form, fixes the man, as regards his love type, in a corresponding primitive stage, the stage of ungovernableness and surrender to the emotions Such was the psychologic situation of the passing antiquity, and the Redeemer and Physician of that time was he who endeavored to educate man to the sublimation of the incestuous libido [15] The destruction of slavery was the necessary condition of that sublimation, for antiquity had not yet recognised the duty of work and work as a duty, as a social need of fundamental importance Slave labor was compulsory work, the counterpart of the equally disastrous compulsion of the libido of the privileged It was only the obligation of the individual to work which made possible in the long run that regular "drainage" of the unconscious, which was inundated by the continual regression of the libido Indolence is the beginning of all vice, because in a condition of slothful dreaming the libido has abundant opportunity for sinking into itself, in order to create compulsory obligations by means of regressively reanimated incestuous bonds The best liberation is through *regular work* [16] Work, however, is salvation only when it is a free act, and has in itself nothing of infantile compulsion In this respect, religious ceremony appears in a high degree as organised inactivity, and at the same time as the forerunner of modern work

Miss Miller's vision treats the problem of the sacrifice of the infantile longing, in the first place, as an individual problem, but if we cast a glance at the form of this presentation, then we will become aware that here it must concern something, which is also a problem of humanity in general For the symbols employed, the serpent which killed the horse [17] and the hero voluntarily sacrificing himself, are primitive figures of phantasies and religious myths streaming up from the unconscious

* Fate † Chances and fates

In so far as the world and all within it is, above all, a thought which is credited with transcendental "substance" through the empirical need of the same, there results from the creation of the regressive libido the creation of the world, and psychologically speaking, the world in general. For him who looks backward the world, and even the infinite starry sky, is the mother[18] who bends over and encloses him on all sides, and from the renunciation of this idea and from the longing for this idea arises the image of the world. From this most simple fundamental thought, which perhaps appears strange to us only because it is conceived according to the *principle of desire and not the principle of reality*,[19] results the significance of the cosmic sacrifice. A good example of this is the slaying of the Babylonian primitive mother Tiamat, the dragon, whose body is destined to form the heaven and the earth. We come upon this thought in its most complete form in Hindoo philosophy of the most ancient date; namely, in songs of Rigveda. In Rigveda 10: 81, 4, the song inquires:

> "What was the tree, what wood in sooth produced it, from which they fashioned out the earth and heaven?
> Ye thoughtful men inquire within your spirit, whereon he stood when he established all things."

Viçvakarman, the All-Creator, who created the world from the unknown tree, did so as follows:

> "He who sacrificing, entered into all these beings
> As a wise sacrificer, our Father, who
> Striving for blessings through prayer
> Hiding his origin
> Entered this lowly world,
> What and who has served him
> As a resting-place and a support?"[20]

Rigveda 10: 90, gives answer to these questions. Purusha is the primal being who

> " . . . . covered earth on every side and
> Spread ten fingers' breadth beyond."

One sees that Purusha is a sort of Platonic world soul, who surrounds the world from without. Of Purusha it is said:

> "Being born he overtopped the earth
> Before, behind, and in all places."

The mother symbolism is plain, it seems to me, in the idea of Purusha. He represents the mother-imago and the libido of the child clinging to her. From this assumption all that follows is very easily explained:

> "As sacrificial animal on the bed of straw
> Was dedicated the Purusha,
> Who was born on the straw,
> Whom the Gods, the Blest, and the Wise,
> Meeting there sacrificed."

This verse is very remarkable; if one wishes to stretch this mythology out on the procrustean bed of logic, sore violence would have to be committed. It is an incredibly phantastic conception that, beside the gods, ordinary "wise men" unite in sacrificing the primitive being, aside from the circumstance that, beside the primitive being, nothing had existed in the beginning (that is to say, before the sacrifice), as we shall soon see. If the great mystery of the mother sacrifice is meant thereby, then all becomes clear:

> "From that great general sacrifice
> The dripping fat was gathered up
> He formed the creatures of the air,
> And animals both wild and tame.
> From that great general sacrifice
> Richas and Sama-hymns were born:
> Therefrom the metres were produced,
> The Yajus had its birth from it.
>
> "The moon was gendered from his mind
> And from his eye the Sun had birth;
> Indra and Agni from his mouth
> Were born, and Vâyu from his breath.
>
> "Forth from his navel came midair;
> The sky was fashioned from his head;
> Earth from his feet, and from his ears
> The regions. Thus they formed the worlds."

It is evident that by this is meant not a physical, but a psychological cosmogony. The world arises when man discovers it. He discovers it when he sacrifices the mother; that is to say, when he has freed himself from the midst of his unconscious lying in the mother. That which impels him forward to this discovery may be interpreted psychologically as the so-called "Incest barrier" of Freud. The incest prohibition places an end to the childish longing for the food-giving mother, and compels the libido, gradually becoming sexual, into the path of the biological aim. The libido forced away from the mother by the incest prohibition seeks for the sexual object in the place of the forbidden mother. In this wider psychological sense, which expresses itself in the allegoric language of the "incest prohibition," "mother," etc., must be understood Freud's paradoxical sentence, "Originally we have known only sexual objects."[21] This sentence must be understood psychologically throughout, in the sense of a world image created from within outwards, which has, in the first place, nothing to do with the so-called "objective" idea of the world. This is to be understood as a new edition of the subjective idea of the world corrected by reality. Biology, as a science of objective experience, would have to reject unconditionally Freud's proposition, for, as we have made clear above, the function of reality can only be partly sexual; in another equally important part it is self-preservation. The matter appears different for that thought which accompanies

the biological function as an epiphenomenon. As far as our knowledge reaches, the individual act of thought is dependent wholly or in greatest part on the existence of a highly differentiated brain, whereas the function of reality (adaptation to reality) is something which occurs in all living nature as wholly independent from the act of thought. This important proposition of Freud's applies only to the act of thought, for thinking, as we may recognise from manifold traces, arose dynamically from the libido, which was split off from the original object at the "incest barrier" and became actual when the first budding sexual emotions began to flow in the current of the libido which goes to the mother. Through the incest barrier the sexual libido is forced away from the identification with the parents, and introverted for lack of adequate activity. It is the sexual libido which forces the growing individual slowly away from his family. If this necessity did not exist, then the family would always remain clustered together in a solid group. Hence the neurotic always renounces a complete erotic experience [22] in order that he may remain a child. Phantasies seem to arise from the introversion of the sexual libido. Since the first childish phantasies most certainly do not attain the quality of a conscious plan, and as phantasies likewise (even among adults) are almost always the direct derivates of the unconscious, it is, therefore, highly probable that the first phantastic manifestations arise from an act of regression. As we illustrated earlier, the regression goes back to the presexual stage, as many traces show. Here the sexual libido obtains again, so to speak, that universal capacity of application, or capacity for displacement, which it actually possessed at that stage when the sexual application was not yet discovered. Naturally, no adequate object is found in the presexual stage for the regressive sexual libido, but only surrogates, which always leave a wish; namely, the wish to have the surrogate as similar as possible to the sexual goal. This wish is secret, however, for it is really an incest wish. The unsatisfied unconscious wish creates innumerable secondary objects, symbols for the primitive object, the mother (as the Rigveda says, the creator of the world, "hiding his origin," enters into things). From this the thought or the phantasies proceed, as a desexualised manifestation of *an originally sexual libido*.

From the standpoint of the libido, the term "incest barrier" corresponds to one aspect, but the matter, however, may be considered from another point of view.

The time of undeveloped sexuality, about the third and the fourth year, is, at the same time, considered externally, the period when the child finds himself confronted with increased demands from the world of reality. He can walk, speak and independently attend to a number of other things. He sees himself in a relation to a world of unlimited possibilities, but in which he dares to do little or nothing, because he is as yet too much of a baby and cannot get on without his mother. At this time mother should be ex-

changed for the world Against this the past rises as the greatest resistance, this is always so whenever man would undertake a new adaptation In spite of all evidence and against all conscious resolutions, the unconscious (the past) always enforces its standpoint as resistance In this difficult position, precisely at this period of developing sexuality, we see the dawning of the mind The problem of the child at this period is the discovery of the world and of the great trans-subjective reality For that he must lose the mother, every step out into the world means a step away from the mother Naturally, all that which is retrogressive in men rebels against this step, and energetic attempts are made against this adaptation in the first place Therefore, this period of life is also that in which the first clearly developed neuroses arise The tendency of this age is one directly opposed to that of dementia præcox The child seeks to win the world and to leave the mother (this is a necessary result) The dementia præcox patient, however, seeks to leave the world and to regain the subjectivity of childhood We have seen that in dementia præcox the recent adaptation to reality is replaced by an archaic mode of adaptation, that is to say, the recent idea of the world is rejected in favor of an archaic idea of the world When the child renounces his task of adaptation to reality, or has considerable difficulties in this direction, then we may expect that the recent adaptation will again be replaced by archaic modes of adaptation It would, therefore, be conceivable that through regression in children archaic products would naturally be unearthed, that is to say, old ways of functioning of the thought system, which is inborn with the brain differentiation, would be awakened

According to my available but as yet unpublished material, a remarkably archaic and at the same time generally applicable character seems to appertain to infantile phantasy, quite comparable with the products of dementia præcox. It does not seem improbable that through regression at this age those same associations of elements and analogies are reawakened which formerly constituted the archaic idea of the world. When we now attempt to investigate the nature of these elements, a glance at the psychology of myths is sufficient to show us that the archaic idea was chiefly sexual anthropomorphism It appears that these things in the unconscious childish phantasy play an extraordinary rôle, as we can recognise from examples taken at random Just as the sexualism of neuroses is not to be taken literally but as regressive phantasy and symbolic compensation for a recent unachieved adaptation, so is the sexualism of the early infantile phantasy, especially the incest problem, a regressive product of the revival of the archaic modes of function, outweighing actuality On this account I have expressed myself very vaguely in this work, I am sure, in regard to the incest problem. This is done in order not to be responsible for the idea that I understand by it a gross sexual inclination towards

the parents The true facts of the case are much more complicated as my investigations point out Originally incest probably never possessed particularly great significance as such, because cohabitation with an old woman for all possible motives could hardly be preferred to mating with a young woman It seems that the mother has acquired incestuous significance only psychologically Thus, for example, the incestuous unions of antiquity were not a result of a love inclination, but of a special superstition, which is most intimately bound up with the mythical ideas here treated A Pharoah of the second dynasty is said to have married his sister, his daughter and his granddaughter, the Ptolemies were accustomed also to marriage with sisters, Kambyses married his sister, Artaxerxes married his two daughters, Qobad I (sixth century A D) married his daughter The Satrap Sysimithres married his mother These incestuous unions are explained by the circumstance that in the Zend Avesta the marriage of relatives was directly commanded,[23] it emphasised the resemblance of rulers to the divinity, and, therefore, was more of an artificial than a natural arrangement, because it originated more from a theoretical than from a biological inclination (A practical impetus towards that lay often in the peculiar laws of inheritance left over from the *Mutter recht*, "maternal right" [matriarchal], period) The confusion which certainly frequently involved the barbarians of antiquity in regard to the choice of their sexual objects cannot very well be measured by the standard of present-day love psychology In any case, the incest of the semi animal past is in no way proportionate to the enormous significance of the incest phantasy among civilised people This disproportion enforces the assumption that the incest prohibition which we meet even amongst relatively lower races concerns rather the mythical ideas than the biological damage, therefore, the ethnical prohibition almost always concerns the mother and seldom the father Incest prohibition can be understood, therefore, as a result of regression, and as the result of a libidinous anxiety, which regressively attacks the mother Naturally, it is difficult or impossible to say from whence this anxiety may have come I merely venture to suggest that it may have been a question of a primitive separation of the pairs of opposites which are hidden in the will of life: the will for life and for death. It remains obscure what adaptation the primitive man tried to evade through introversion and regression to the parents, but, according to the analogy of the soul life in general, it may be assumed that the libido, which disturbed the initial equilibrium of becoming and of ceasing to be, had been stored up in the attempt to make an especially difficult adaptation, and from which it recedes even to-day

After this long regression, let us turn back to the song of the Rigveda Thinking and a conception of the world arose from a shrinking back from stern reality, and it is only after man has regressively assured himself again of the protective parental power[24]

that he enters life wrapped in a dream of childhood shrouded in magic superstitions, that is to say, "thinking,"[25] for he, timidly sacrificing his best and assuring himself of the favour of the invisible powers, step by step develops to greater power, in the degree that he frees himself from his retrogressive longing and the original lack of harmony in his being

Rigveda 10, 90, concludes with the exceedingly significant verse which is of greatest importance for the Christian mysteries as well'

'Gods, sacrificing, rendered homage to the sacrifice these were the earliest holy ordinances,
The mighty ones attained the height of heaven, there where the Sâdhyas, goddesses of old, are dwelling"

Through the sacrifice a fulness of power was attained, which extends up to the power of the "parents" Thus the sacrifice has also the meaning of a psychologic maturation process

In the same manner that the world originated through sacrifice, through the renunciation of the retrospective mother libido, thus, according to the teachings of the Upanishads, is produced the new condition of man, which may be termed the immortal This new condition is again attained through a sacrifice, namely, through the sacrificial horse which is given a cosmic significance in the teaching of the Upanishads What the sacrificial horse means is told by Brihadâranyaka-Upanishad 1 1

"*Om*'

"1 The dawn is truly the head of the sacrificial horse, the sun his eye, the wind his breath, his mouth the all-spreading fire, the year is the body of the sacrificial horse The sky is his back, the atmosphere his body cavity, the earth the vault of his belly, the poles are his sides, the space between the poles his ribs, the seasons his limbs, the months and half-months his joints, day and night his feet, the stars his bones, the clouds his flesh, the food, which he digests, are the deserts, the rivers, his veins; liver and lungs, the mountains, the herbs and trees, his hair, the rising sun is his fore-part, the setting sun his hind-part When he shows his teeth, that is lightning, when he trembles, that is thunder; when he urinates, that is rain, his voice is speech

"2 The day, in truth, has originated for the horse as the sacrificial dish, which stands before him, his cradle is in the world-sea towards the East, the night has originated for him as the sacrificial dish, which stands behind him, its cradle is in the world sea of the evening, these two dishes originated in order to surround the horse As a charger he generated the gods, as champion he produced the Gandharvas, as a racer the demons, as horse mankind The Ocean is his relative, the ocean his cradle"

As Deussen remarks, the sacrificial horse has the significance of a *renunciation of the universe* When the horse is sacrificed, then the world is sacrificed and destroyed, as it were—a train of thought which Schopenhauer also had in mind, and which appears as a product of a diseased mind in Schreber[26] The horse in the above text stands between two sacrificial vessels, from one of which it comes and to the other of which it goes, just as the sun passes from morning to evening The horse, therefore, signifies the libido,

which has passed into the world. We previously saw that the "mother libido" must be sacrificed in order to produce the world; here the world is destroyed by the repeated sacrifice of the same libido which once belonged to the mother. The horse can, therefore, be substituted as a symbol for this libido, because, as we saw, it had manifold connections with the mother.[27] The sacrifice of the horse can only produce another state of introversion, which is similar to that before the creation of the world. The position of the horse between the two vessels, which represent the producing and the devouring mother, hint at the idea of life enclosed in the ovum; therefore, the vessels are destined to "surround" the horse. That this is actually so the Brihadâranyaka-Upanishad 3, 3 proves:

"1. From where have the descendants of Parikshit come, that I ask thee, Yâjñavalkya! From where came the descendants of Parikshit?

"2. Yâjñavalkya spake: 'He has told thee, they have come from where all come, who offer up the sacrificial horse. That is to say, this world extends so far as two and thirty days of the chariot of the Gods (the sun) reach. This (world) surrounds the earth twice around. This earth surrounds the ocean twice around. There is, as broad as the edge of a razor or as the wing of a fly, a space between (the two shells of the egg of the world). These were brought by India as a falcon to the wind; and the wind took them up into itself and carried them where were the offerers of the sacrificial horse. Somewhat like this he spoke (Gandharva to thee) and praised the wind.'

"Therefore is the wind the special (vyasnti) and the wind the universal (samashti). He, who knows this, defends himself from dying again."

As this text tells us, the offerers of the sacrificial horse come in that *narrowest fissure* between the shells of the egg of the world, at that place, where the shells *unite and where they are divided*. The fissure (*vagina*) in the maternal world soul is designated by Plato in "Timaeus" by X, the symbol of the cross. India, who as a falcon has stolen the soma (the treasure attainable with difficulty), brings, as Psychopompos, the souls to the wind, to the generating pneuma, which carries them forward to the fissure or vagina, to the point of union, to the entrance into the maternal egg. This train of thought of the Hindoo philosophy briefly and concisely summarises the sense of innumerable myths; at the same time it is a striking example of the fact that philosophy is internally nothing else but a refined and sublimated mythology. It is brought to this refined state by the influence of the corrector of reality.[28] We have emphasised the fact that in the Miller drama the horse is the first to die, as the animal brother of the hero. (Corresponding to the early death of the half-animal Eabani, the brother friend of Gilgamesh.) This sacrificial death recalls the whole category of mythological animal sacrifices. Volumes could be filled with parallels, but we must limit ourselves here to suggestions. The sacrificial animal, where it has lost the primitive meaning of the simple sacrificial gift, and has taken a higher religious significance, stands in a close relation to both the hero and the divinity. The animal represents

the god himself; [29] thus the bull [30] represents Zagreus, Dionysus and Mithra; the lamb represents Christ,[31] etc. As we are aware, the animal symbols represent the animal libido. The sacrifice of the animal means, therefore, the sacrifice of the animal nature. This is most clearly expressed in the religious legend of Attis. Attis is the son lover of the divine mother, Agdistis Cybele. Agdistis was characteristically androgynous,[32] as symbol of the mother-libido, like the tree; really a clear indication that the mother-imago has in addition to the significance of the likeness of the real mother the meaning of the mother of humanity, the libido in general. Driven mad by the insanity-breeding mother enamored of him, he emasculates himself, and that under a pine tree. (The pine tree plays an important rôle in his service. Every year a pine tree was wreathed about and upon it an image of Attis was hung, and then it was cut down, which represents the castration.) The blood, which spurted to the earth, was transformed into budding violets. Cybele now took this pine tree, bore it into her cavern and there wept over it. (Pietà.) The chthonic mother takes her son with her into the cavern—namely, into the womb—according to another version. Attis was transformed into the pine tree. The tree here has an essentially phallic meaning; on the contrary, the attaching of the image of Attis to the tree refers also to the maternal meaning. ("To be attached to the mother.") In Ovid ("Metamorphoses," Book X) the pine tree is spoken of as follows:

> "Grata deum matri, siquidem Cybeleius Attis
> Exuit hac hominem, truncoque induruit illo." *

The transformation into the pine tree is evidently a burial in the mother, just as Osiris was overgrown by the heather. Upon the Attis bas-relief of Coblenz Attis appears *growing out of a tree*, which is interpreted by Mannhardt as the "life-principle" of vegetation inherent in the tree. It is probably a tree birth, just as with Mithra. (Relief of Heddernheim.) As Firmicus observes, in the Isis and Osiris cult and also in the cult of the virgin Persephone, tree and image had played a rôle.[33] Dionysus had the surname Dendrites, and in Boeotia he is said to have been called ἔνδενδρος, meaning "in a tree." (At the birth of Dionysus, Megaira planted the pine tree on the Kithairon.) The Pentheus myth bound up with the Dionysus legend furnishes the remarkable and supplementary counterpart to the death of Attis, and the subsequent lamentation. Pentheus,[34] curious to espy the orgies of the Maenades, *climbed upon a pine tree*, but he was observed by his mother; the Maenades cut down the tree, and Pentheus, taken for an animal, was torn by them in frenzy,[35] his own mother being the first to rush upon him. In this myth the phallic meaning of the tree (cutting down, castration) and its maternal significance (mounting and the sacrificial death of the

* Beloved of the mother of the gods, inasmuch as the Cybeline Attis sheds his human shape in this way and stiffens into his tree trunk.

son) is present; at the same time the supplementary counterpart to the Pieta is apparent, the "terrible mother." The feast of Attis was celebrated as a lamentation and then as a joy in the spring (Good Friday and Easter). The priests of Attis-Cybele worship were often eunuchs, and were called Galloi.[37] Instead of the annual castration, the priests merely scratched their arms until they bled. (Arm in place of phallus, "the twisting of arms.") A similar symbolism of the sacrificial impulse is met in the Mithraic religion, where essential parts of the mysteries consist in the catching and the subduing of the bull.

A parallel figure to Mithra is the primitive man Gayomard. He was created together with his bull, and the two lived for six thousand years in a blissful state. But when the world came into the cycle of the seventh sign of the Zodiac (Libra) the evil principle entered. Libra is astrologically the so-called positive domicile of Venus; the evil principle, therefore, came under the dominion of the goddess of love (destruction of the sun-hero through the mother-wife—snake, whore, etc.). As a result, after thirty years, Gayomard and his bull died. (The trials of Zartusht lasted also thirty years; compare the span of Christ's life.) Fifty-five species of grain came from the dead bull, twelve kinds of salubrious plants, etc. The sperma of the bull entered into the moon for purification, but the sperma of Gayomard entered into the sun. This circumstance possibly suggests a rather feminine meaning of bull. Gosh or Drvâçpa is the soul of the bull, and was worshipped as a female divinity. She would not, at first, from diffidence, become the goddess of the herds, until the coming of Zarathustra was announced to her as consolation. This has its parallel in the Hindoo Purana, where the coming of Krishna was promised the earth. (A complete analogy to Christ.[38]) She, too, travels in her chariot, like Ardvîçûra, the goddess of love. The soul of the bull is, therefore, decidedly feminine. This myth of Gayomard repeats only in an altered form the primitive conception of the closed ring of a male-female divinity, self-begetting and forth-bringing.

Like the sacrificial bull, the fire, the sacrifice of which we have already discussed in Chapter III, has a feminine nature among the Chinese, according to the commentaries[39] of the philosopher Tschwang-Tse:

"The spirit of the hearth is called Ki. He is clad in bright red, which resembles fire, and appears as a lovely, attractive maiden."

In the "Book of Rites" it is said:

"Wood is burned in the flames for the spirit of Au. This sacrifice to Au is a sacrifice to old departed women."

These spirits of the hearth and fire are the souls of departed cooks and, therefore, are called "old women." The kitchen god develops from this pre-Buddhistic tradition and becomes later (male sex) the

ruler of the family and the *mediator between family and god*. Thus the old feminine fire spirit becomes a species of Logos. (Compare with this the remarks in Chapter III.)

From the bull's sperma the progenitors of the cattle came, as well as two hundred and seventy-two species of useful animals. According to Mînôkhired, Gayomard had destroyed the Dev Azûr, who was considered the demon of evil appetites.[40] In spite of the efforts of Zarathustra, this demon remained longest on the earth. He was destroyed at last at the resurrection, like Satan in the Apocalypse of John. In another version it is said that Angromainyus and the serpent were left until the last, so as to be destroyed by Ahuramazda himself. According to a surmise by Kern, Zarathustra may mean "golden-star" and be identical with Mithra. Mithra's name is connected with neo-Persian *Mihr*, which means "sun and love."

In Zagreus we see that the bull is also identical with the god; hence the bull sacrifice is a god sacrifice, but on a primitive stage. The animal symbol is, so to speak, only a part of the hero; he sacrifices only his animal; therefore, symbolically, renounces only his animal nature. The internal participation in the sacrifice[41] is expressed excellently in the anguished ecstatic countenance of the bull-slaying Mithra. He does it willingly and unwillingly;[42] hence the somewhat hysterical expression which has some similarity to the well-known mawkish countenance of the Crucified of Guido Reni. Benndorf says:[43]

"The features which, especially in the upper portion, bear an absolutely ideal character, have an extremely morbid expression."

Cumont[44] himself says of the facial expression of the Tauroctonos:

"The countenance, which may be seen in the best reproductions, is that of a young man of an almost feminine beauty; the head has a quantity of curly hair, which, rising up from the forehead, surrounds him as with a halo; the head is slightly tilted backwards, so that the glance is directed towards the heavens, and the contraction of the brows and the lips give a strange expression of sorrow to the face."[45]

The Ostian head of Mithra Tauroctonos, illustrated in Cumont, has, indeed, an expression which we recognise in our patients as one of sentimental resignation. *Sentimentality is repressed brutality.* Hence the exceedingly sentimental pose, which had its counterpart in the symbolism of the shepherd and the lamb of contemporaneous Christianity, with the addition of infantilism.[46]

Meanwhile, it is only his animal nature which the god sacrifices; that is to say, his sexuality,[47] always in close analogy to the course of the sun. We have learned in the course of this investigation that the part of the libido which erects religious structures is in the last analysis fixed in the mother, and really represents that tie through which we are permanently connected with our origin. Briefly, we may designate this amount of libido as "Mother Libido." As we

have seen, this libido conceals itself in countless and very heterogeneous symbols, also in animal images, no matter whether of masculine or feminine nature—differences of sex are at bottom of a secondary value and psychologically do not play the part which might be expected from a superficial observation.

The annual sacrifice of the maiden to the dragon probably represented the most ideal symbolic situation. In order to pacify the anger of the "terrible mother" the most beautiful woman was sacrificed as symbol of man's libido. Less vivid examples are the sacrifice of the first-born and various valuable domestic animals. A second ideal case is the self-castration in the service of the mother (Dea Syria, etc.), a less obvious form of which is circumcision. By that at least only a portion is sacrificed.[48] With these sacrifices, the object of which in ideal cases is to symbolise the libido drawing away from the mother, life is symbolically renounced in order to regain it. By the sacrifice man ransoms himself from the fear of death and reconciles the destroying mother. In those later religions, where the hero, who in olden times overcomes all evil and death through his labors, has become the divine chief figure, he becomes the priestly sacrificer and the regenerator of life. But as the hero is an imaginary figure and his sacrifice is a transcendental mystery, the significance of which far exceeds the value of an ordinary sacrificial gift, this deepening of the sacrificial symbolism regressively resumes the idea of the human sacrifice. This is partly due to the preponderance of phantastic additions, which always take their subject-matter from greater depths, and partly due to the higher religious occupation of the libido, which demanded a more complete and equivalent expression. Thus the relation between Mithra and his bull is very close. It is the hero himself in the Christian mysteries who sacrifices himself voluntarily. The hero, as we have sufficiently shown, is the infantile personality longing for the mother, who as Mithra sacrifices the wish (the libido), and as Christ gives himself to death both willingly and unwillingly. Upon the monuments of the Mithraic religion we often meet a strange symbol: a crater (mixing bowl) encoiled by a serpent, sometimes with a lion, who as antagonist opposes the serpent.[49] It appears as if the two were fighting for the crater. The crater symbolises, as we have seen, the mother, the serpent the resistance defending her, and the lion the greatest strength and strongest will.[50] The struggle is for the mother. The serpent takes part almost regularly in the Mithraic sacrifice of the bull, moving towards the blood flowing from the wound. It seems to follow from that that the life of the bull (blood) is sacrificed to the serpent. Previously we have pointed out the mutual relationship between serpent and bull, and found there that the bull symbolises the living hero, the shining sun, but that the serpent symbolises the dead, buried or chthonic hero, the invisible sun. As the hero is in the mother in the state of death, the serpent is also, as the symbol of the fear of death, the sign of the devouring

mother. The sacrifice of the bull to the serpent, therefore, signifies a willing renunciation of life, in order to win it from death. Therefore, after the sacrifice of the bull, wonderful fertility results. The antagonism between serpent and lion over the crater is to be interpreted as a battle over the fruitful mother's womb, somewhat comparable to the more simple symbolism of the Tishtriya song, where the demon Apaosha, the black horse, has possession of the rain lake, and the white horse, Tishtriya, must banish him from it. Death from time to time lays its destroying hand upon life and fertility and the libido disappears, by entering into the mother, from whose womb it will be born renewed. It, therefore, seems very probable that the significance of the Mithraic bull sacrfice is also that of the sacrifice of the mother who sends the fear of death. As the contrary of the Occide moriturus is also intended here, so is the act of sacrifice an impregnating of the mother; the chthonic snake demon drinks the blood; that is to say, the libido (sperma) of the hero committing incest. Life is thus immortalised for the hero because, like the sun, he generates himself anew. After all the preceding materials, it can no longer be difficult to recognise in the Christian mysteries the human sacrifice, or the sacrifice of the son to the mother.[51] Just as Attis emasculates himself on account of the mother, so does Christ himself hang upon the tree of life,[52] the wood of martyrdom, the ἑκάτῃ,* the chthonic mother, and by that redeems creation from death. By entering again into the mother's womb (Matuta, Pietà of Michelangelo) he redeems in death the sin in life of the primitive man, Adam, in order symbolically through his deed[53] to procure for the innermost and most hidden meaning of the religious libido its highest satisfaction and most pronounced expression. The martyrdom of Christ has in Augustine as well actually the meaning of a Hierosgamos with the mother (corresponding to the Adonis festival, where Venus and Adonis were laid upon the nuptial couch).

"Procedit Christus quasi sponsus de thalamo suo, præsagio nuptiarum exiit ad campum sæculi; pervenit usque ad crucis torum (torus has the meaning of bed, pillow, concubine, bier) et ibi firmavit ascendendo conjugium: ubi cum sentiret anhelantem in suspiriis creaturam commercio pietatis se pro conjuge dedit ad pœnam et copulavit sibi perpetuo iure matronam."

This passage is perfectly clear. A similar death overtakes the Syrian Melcarth, who, riding upon a sea horse, was annually burned. Among the Greeks he is called Melicertes, and was represented riding upon a dolphin. The dolphin is also the steed of Arion. We have learned to recognise previously the maternal significance of dolphin, so that in the death of Melcarth we can once more recognise the negatively expressed Hierosgamos with the mother. (Compare Frazer "Golden Bough," IV, p. 87.) This figurative expression is of the greatest teleological significance. Through its symbol it leads

* Hecate

that libido which inclines backward into the original, primitive and impulsive upwards to the spiritual by investing it with a mysterious but fruitful function. It is superfluous to speak of the effect of this symbol upon the unconscious of Occidental humanity. A glance over history shows what creative forces were released in this symbol.[a]

The comparison of the Mithraic and the Christian sacrifice plainly shows wherein lies the superiority of the Christian symbol; it is the frank admission that not only are the lower wishes to be sacrificed, but the whole personality. The Christian symbol demands complete devotion; it compels a veritable self-sacrifice to a higher purpose, while the Sacrificium Mithraicum, remaining fixed on a primitive symbolic stage, is contented with an animal sacrifice. The religious effect of these symbols must be considered as an orientation of the unconscious by means of imitation.

In Miss Miller's phantasy there is internal compulsion, in that she passes from the horse sacrifice to the self-sacrifice of the hero. Whereas the first symbolises renunciation of the sexual wishes, the second has the deeper and ethically more valuable meaning of the sacrifice of the infantile personality. The object of psychoanalysis has frequently been wrongly understood to mean the renunciation or the gratification of the ordinary sexual wish, while, in reality, the problem is the sublimation of the infantile personality, or, expressed mythologically, a sacrifice and rebirth of the infantile hero.[65] In the Christian mysteries, however, the resurrected one becomes a supermundane spirit, and the invisible kingdom of God with its mysterious gifts, are obtained by his believers through the sacrifice of himself on the mother. In psychoanalysis the infantile personality is deprived of its libido fixations in a rational manner; the libido which is thus set free serves for the building up of a personality matured and adapted to reality, who does willingly and without complaint everything required by necessity. (It is, so to speak, the chief endeavour of the infantile personality to struggle against all necessities and to create coercions for itself where none exist in reality.)

The serpent as an instrument of sacrifice has already been abundantly illustrated. (Legend of St. Silvester, trial of the virgins, wounding of Rê and Philoctetes, symbolism of the lance and arrow.) It is the destroying knife; but, according to the principle of the "Occide moriturus" also the phallus, the sacrificial act represents a coitus fact as well.[66] The religious significance of the serpent as a cave-dwelling, chthonic animal points to a further thought; namely, to the creeping into the mother's womb in the form of a serpent.[67] As the horse is the brother, so the serpent is the sister of Chiwantopel. This close relation refers to a fellowship of these animals and their characters with the hero. We know of the horse that, as a rule, he is not an animal of fear, although, mythologically, he has at times this meaning. He signifies much more the living, positive part of the libido, the striving towards continual renewal, whereas the

serpent, as a rule, represents the fear, the fear of death [58] and is thought of as the antithesis to the phallus This antithesis between horse and serpent, mythologically between bull and serpent, represents an opposition of the libido within itself, a striving forwards and a striving backwards at one and the same time [59] It is not only as if the libido might be an irresistible striving forward, an endless life and will for construction, such as Schopenhauer has formulated in his world will, death and every end being some malignancy or fatality coming from without, but the libido, corresponding to the sun, also wills the destruction of its creation In the first half of life its will is for growth, in the second half of life it hints, softly at first, and then audibly, at its will for death. And just as in youth the impulse to unlimited growth often lies under the enveloping covering of a resistance against life, so also does the will of the old to die frequently lie under the covering of a stubborn resistance against the end

This apparent contrast in the nature of the libido is strikingly illustrated by a Priapic statuette in the antique collection at Verona [60] Priapus smilingly points with his finger to a snake biting off his " membrum " He carries a basket on his arm, filled with oblong objects, probably phalli, evidently prepared as substitutes

A similar motive is found in the " Deluge " of Rubens (in the Munich Art Gallery), where a serpent emasculates a man This motive explains the meaning of the " Deluge " , the maternal sea is also the devouring mother [61] The phantasy of the world conflagration, of the cataclysmic end of the world in general, is nothing but a mythological projection of a personal individual will for death , therefore, Rubens could represent the essence of the " Deluge " phantasy in the emasculation by the serpent , for the serpent is our own repressed will for the end, for which we find an explanation only with the greatest difficulty

Concerning the symbolism of the serpent in general, its significance is very dependent upon the time of life and circumstances The repressed sexuality of youth is symbolised by the serpent, because the arrival of sexuality puts an end to childhood To age, on the contrary, the serpent signifies the repressed thought of death With our author it is the insufficiently expressed sexuality which as serpent assumes the rôle of sacrificer and delivers the hero over to death and rebirth

As in the beginning of our investigation the hero's name forced us to speak of the symbolism of Popocatepetl as belonging to the creating part of the human body, so at the end does the Miller drama again give us an opportunity of seeing how the volcano assists in the death of the hero and causes him to disappear by means of an earthquake into the depths of the earth As the volcano gave birth and name to the hero, so at the end of the day it devours him again [62] We learn from the last words of the hero that *his longed-for beloved*, she who alone understands him, is called Ja-ni-wa-ma We find

in this name those lisped syllables familiar to us from the early childhood of the hero, Hiawatha, Wawa, wama, mama. The only one who really understands us is the mother. For *verstehen*, "to understand" (Old High German *firstân*), is probably derived from a primitive Germanic prefix *fri*, identical with περί, meaning "roundabout." The Old High German *antfristôn*, "to interpret," is considered as identical with *firstân*. From that results a fundamental significance of the verb *verstehen*, "to understand," as "standing round about something."[18] *Comprehendere* and κατασυλλαμβάνειν express a similar idea as the German *erfassen*, "to grasp, to comprehend." The thing common to these expressions is the surrounding, the enfolding. And there is no doubt that there is nothing in the world which so completely enfolds us as the mother. When the neurotic complains that the world has no understanding, he says indirectly that he misses the mother. Paul Verlaine has expressed this thought most beautifully in his poem, "Mon Rêve Familier":

My Familiar Dream

Often I have that strange and poignant dream
  Of some unknown who meets my flame with flame,
  Who, with each time, is never quite the same,
Yet never wholly different does he seem.
She understands me! Every fitful gleam
  Troubling my heart, she reads aright; and how
  Even the sweat upon my pallid brow
She soothes with tears, a cool and freshening stream.

"If she is dark or fair? I do not know—
Her name? Only that it is sweet and low,
  Like those of loved ones who have long since died.
Her look is like a statue's, kind and clear,
  And her calm voice, distant and dignified,
Like those hushed voices that I loved to hear."

NOTES

PART I.

INTRODUCTION

[1] He is said to have killed himself when he heard that she whom he so passionately adored was his mother

[2] "Wish Fulfilment and Symbolism in Fairy Tales" Tr. by W A White, M D

[3] "Dream and Myth" Deuticke, Wien 1909.

[4] "The Myth of the Birth of the Hero"

[5] "Die Symbolik in den Legenden, Marchen, Gebräuchen und Traumen" *Psychiatrisch-Neurologische Wochenschrift* X Jahrgang

[6] "On the Nightmare" *Amer Journ of Insanity*, 1910

[7] *Jahrbuch*, 1910, Pt. II

[8] "Die Frommigkeit des Grafen Ludwig von Zinzendorf Ein psychoanalytischer Beitrag zur Kenntnis der religiosen Sublimationsprozesse und zur Erklarung des Pietismus" Deuticke, Wien 1910 We have also a hint in Freud's work, "Eine Kindheitserinnerung des Leonardo da Vinci" Deuticke, Wien 1910

[9] Compare Rank in *Jahrbuch*, Pt II, p 465

CHAPTER I

[1] Compare Liepmann, "Über Ideenflucht," Halle 1904, also Jung, "Diagnost Assoc Stud," p 103 "Denken als Unterordnung unter eine herrschende Vorstellung", compare Ebbinghaus, "Kultur der Gegenwart," p 221 Kulpe ("Gr d. Psychologie," p 464) expresses himself in a similar manner "In thinking it is a question of an anticipatory apperception which sometimes governs a greater, sometimes a smaller circle of individual reproductions, and is differentiated from accidental motives of reproduction only by the consequence with which all things outside this circle are held back or repressed"

[2] In his "Psychologia empirica meth scientif pertract," etc, 1732, p 23, Christian Wolff says simply and precisely "Cogitatio est actus animae quo sibi rerumque aliarum extra se conscia est

[3] The moment of adaptation is emphasized especially by William James in his definition of reasoning "Let us make this ability to deal with novel data the technical differentia of reasoning This will sufficiently mark it out from common associative thinking, and will immediately enable us to say just what peculiarity it contains"

[4] "Thoughts are shadows of our experiences always darker, emptier, simpler than these," says Nietzsche Lotze ("Logik," p 552) expresses himself in regard to this as follows "Thought, left to the logical laws of its movement, encounters once more at the end of its regularly traversed course the things suppressed or hidden."

[5] Compare the remarks of Baldwin following in text The eccentric philosopher Johann Georg Hamann (1730 88) even places intelligence and speech as identical (see Hamann's writings, pub by Roth, Berlin 1821) With Nietzsche intelligence fares even worse as "speech metaphysics" (Sprachmetaphysik) Friedrich Mauthner goes the furthest in this conception ("Sprache und Psychologie," 1901) For him there exists absolutely no thought without speech, and speaking is thinking His idea of the "fetish of the word" governing in science is worthy of notice

[6] Compare Kleinpaul "Das Leben der Sprache," 3 Bande Leipzig 1893

[7] "Jardin d'Épicure," p 80

[8] It is difficult to calculate how great is the seductive influence of the primitive word-meaning upon a thought "Anything which has ever been in consciousness remains as an affective moment in the unconscious," says Hermann Paul ("Prinzipien der Sprachgeschichte," 4th ed, 1909, p 25) The old word-meanings have an after-effect, chiefly imperceptible, "within the dark chamber of the unconscious in the Soul" (Paul) J G Hamann, mentioned above, expresses himself unequivocably "Metaphysics reduces all catchwords and all figures of speech of our empirical knowledge to empty hieroglyphics and types of ideal relations" It is said that Kant learned some things from Hamann

[9] "Grundriss der Psychologie," p 365

[10] "Lehrbuch der Psychologie," X, 26

[11] James Mark Baldwin "Thought and Things, or Genetic Logic"

[12] In this connection I must refer to an experiment which Eberschweiler (*Allgemeine Zeitschrift fur Psychiatrie*, 1908) has made at my request, which discloses the remarkable fact that in an association experiment the intrapsychic association is influenced by phonetic considerations ("Untersuchungen uber den Einfluss der sprachlichen Komponente auf die Assoziation," *Allgemeine Zeitschrift fur Psychiatrie*, 1908)

[13] So at least this form of thought appears to Consciousness Freud says in this connection ("The Interpretation of Dreams," tr by Brill, p 418) "It is demonstrably incorrect to state that we abandon ourselves to an aimless course of ideas when we relinquish our reflections, and allow the unwilled ideas to emerge It can be shown that we are able to reject only those end-presentations known to us, and that immediately upon the cessation of these unknown or, as we inaccurately say, unconscious end-presentations come into play which now determine the course of the unwilled ideas—a thought without end presentation cannot be produced through any influence we can exert on our own psychic life"

[14] "Grundriss der Psychologie," p. 464

[15] Behind this assertion stand, first of all, experiences taken from the field of the normal The undirected thinking is very far removed from "meditation," and especially so as far as readiness of speech is concerned In psychological experiments I have frequently found that the subjects of the investigation--I speak only of cultivated and intelligent people, whom I have allowed to indulge in reveries, apparently unintentionally and without previous instruction—have exhibited affect expressions which can be registered experimentally. But the basic thought of these, even with the best of intentions, they could express only incompletely or even not at all One meets with an abundance of similar experiences in association experiments and psychoanalysis—indeed, there is hardly an unconscious complex which has not at some time existed as a phantasy in consciousness

However, more instructive are the experiences from the domain of psychopathology But those arising in the field of the hysterias and neuroses, which are characterised by an overwhelming transference tendency, are rarer than the experiences in the territory of the introversion type of neuroses and

psychoses, which constitute by far the greater number of the mental derangements, at least the collected Schizophrenic group of Bleuler. As has already been indicated by the term "introversion," which I briefly introduced in my study, "Konflikte der kindlichen Seele," pp. 6 and 10, these neuroses lead to an overpowering autoerotism (Freud). And here we meet with this unutterable purely phantastic thinking which moves in inexpressible symbols and feelings. One gets a slight impression of this when one tries to examine the paltry and confused expressions of these people. As I have frequently observed, it costs these patients endless trouble and effort to put their phantasies into common human speech. A highly intelligent patient, who interpreted such a phantasy piece by piece, often said to me, "I know absolutely with what it is concerned, I see and feel everything, but it is quite impossible for me to find the words to express it." The poetic and religious introversion gives rise to similar experiences; for example, Paul, in the Epistle to the Romans viii: 26—"For we know not what we should pray for as we ought: but the Spirit itself maketh intercession with groanings which cannot be uttered."

[16] Similarly, James remarks, "The great difference, in fact, between that simple kind of rational thinking which consists in the concrete objects of past experience merely suggesting each other, and reasoning distinctively so called, is this, that whilst the empirical thinking is only reproductive, reasoning is productive."

[17] Compare the impressive description of Petrarch's ascent of Mt. Ventoux, by Jacob Burckhardt ("Die Kultur der Renaissance in Italien," 1869, p. 235):

"One now awaits a description of the view, but in vain, not because the poet is indifferent to it, but, on the contrary, because the impression affects him all too strongly. His entire past life, with all its follies, passes before him; he recalls that it is ten years ago to-day that he, as a young man, left Bologna, and he turns a yearning glance towards Italy. He opens a book—'Confessions of St. Augustine'—his companion at that time—and his eye falls upon this passage in the tenth chapter: 'and the people went there and admired the high mountains, the wide wastes of the sea and the mighty downward rushing streams, and the ocean and the courses of the stars, and forgot themselves.' His brother, to whom he reads these words, cannot comprehend why, at this point, he closes the book and is silent."

[18] Wundt gives a striking description of the scholastic method in his "Philosophische Studien," XIII, p. 345. The method consists "first in this, that one realizes the chief aim of scientific investigation is the discovery of a comprehensive scheme, firmly established, and capable of being applied in a uniform manner to the most varied problems; secondly, in that one lays an excessive value upon certain general ideas, and, consequently, upon the word-symbols designating these ideas, wherefore an analysis of word-meanings comes, in extreme cases, to be an empty subtlety and splitting of hairs, instead of an investigation of the real facts from which the ideas are abstracted."

[19] The concluding passage in "Traumdeutung" was of prophetic significance, and has been brilliantly established since then through investigations of the psychoses. "In the psychoses these modes of operation of the psychic mechanism, normally suppressed in the waking state, again become operative, and then disclose their inability to satisfy our needs in the outer world." The importance of this position is emphasized by the views of Pierre Janet, developed independently of Freud, and which deserve to be mentioned here, because they add confirmation from an entirely different side, namely, the biological. Janet makes the distinction in the function of a firmly organized "inferior" and "superior" part, conceived of as in a state of continuous transformation.

"It is really on this superior part of the functions, on their adaptation to present circumstances, that the neuroses depend. The neuroses are the

disturbances or the checks in the evolution of the functions—the illnesses depending upon the morbid functioning of the organism These are characterized by an alteration in the superior part of the functions, in their evolution and in their adaptation to the present moment—to the present state of the exterior world and of the individual, and also by the absence or deterioration of the old parts of these same functions

"In the place of these superior operations there are developed physical, mental, and, above all, emotional disturbances This is only the tendency to replace the superior operations by an exaggeration of certain inferior operations, and especially by gross visceral disturbances" ("Les Névroses," p 383)

The old parts are, indeed, the inferior parts of the functions, and these replace, in a purposeless fashion, the abortive attempts at adaptation Briefly speaking, the archaic replaces the recent function which has failed Similar views concerning the nature of neurotic symptoms are expressed by Claparède as well ("Quelques mots sur la definition de l'Hystérie," *Arch de Psychol*, I, VII, p 169)

He understands the hysterogenic mechanism as a "Tendance à la réversion" —as a sort of atavistic manner of reaction

[10] I am indebted to Dr Abraham for the following interesting communication "A little girl of three and a half years had been presented with a little brother, who became the object of the well-known childish jealousy Once she said to her mother, 'You are two mammas, you are my mamma, and your breast is little brother's mamma' She had just been looking on with great interest at the process of nursing" It is very characteristic of the archaic thinking of the child for the breast to be designated as "mamma"

[11] Compare especially Freud's thorough investigation of the child in his "Analyse der Phobie eines funfjährigen Knaben," 1912 *Jahrbuch*, Pt I Also my study, "Konflikte der kindlichen Seele," 1912 *Jahrbuch*, Pt II, p 33

[12] "Human, All Too Human," Vol. II, p 27 and on

[13] "Sammlung kleiner Schriften zur Neurosenlehre," Pt II, p 205

[14] "Der Künstler, Ansätze zu einer Sexualpsychologie," 1907, p 36

[15] "Compare also Rank's later book, "The Myth of the Birth of the Hero"

[16] "Wish Fulfilment and Symbolism in Fairy Tales," 1908

[17] "Dreams and Myths"

[18] Compare with this "Konflikte der kindlichen Seele," p 6, foot

[19] Compare Abraham, "Dreams and Myths," New York 1913 The wish for the future is represented as already fulfilled in the past Later, the childish phantasy is again taken up regressively in order to compensate for the disillusionment of actual life

[20] Rank "The Myth of the Birth of the Hero"

[21] Naturally, it could not be said that because this was an institution in antiquity, the same would recur in our phantasy, but rather that in antiquity it was possible for the phantasy so generally present to become an institution This may be concluded from the peculiar activity of the mind of antiquity

[22] The Dioscuri married the Leucippides by theft, an act which, according to the ideas of higher antiquity, belonged to the necessary customs of marriage (Preller "Griechische Mythologie," 1854, Pt II, p 68)

[23] See S Creuzer · "Symbolik und Mythologie," 1811, Pt III, p 245

[24] Compare also the sodomitic phantasies in the "Metamorphoses" of Apuleius In Herculaneum, for example, corresponding sculptures have been found

[25] Ferrero "Les lois psychologiques du sybolisme"

[36] With the exception of the fact that the thoughts enter consciousness already in a high state of complexity, as Wundt says

[37] Schelling "Philosophie der Mythologie," Werke, Pt II, considers the "preconscious" as the creative source, and Fichte ("Psychologie," I, p 508) considers the preconscious region as the place of origin of the real content of dreams

[38] Compare in this connection, Flournoy "Des Indes à la planète Mars." Also Jung "Zur Psychologie und Pathologie sogenannter occulter Phänomene," and "Über die Psychologie der Dementia praecox." Excellent examples are to be found in Schreber "Denkwürdigkeiten eines Nervenkranken" Mutze, Leipzig

[39] "Jardin d'Épicure"

[40] The figure of Judas acquires a great psychological significance as the priestly sacrificer of the Lamb of God, who by this act sacrifices himself at the same time (Self-destruction) Compare Pt II of this work

[41] Compare with this the statements of Drews ("The Christ Myth"), which are so violently combated by the blindness of our time Clear-sighted theologians, like Kalthoff ("Entstehung des Christentums," 1904) present as impersonal a judgment as Drews Kalthoff says, "The sources from which we derive our information concerning the origin of Christianity are such that in the present state of historical research no historian would undertake the task of writing the biography of an historical Jesus" [illegible] "To look behind these stories the life of a real historical personage would not occur to any man, if it were not for the influence of rationalistic theology" Ibid p 9 "The divine in Christ, always considered in intimate connection with the human, leads in a straight line [illegible] God, through the Epistles and Gospels [illegible] of Daniel, in which the theological conception of the [illegible] At every single point of this line Christ shows [illegible], nowhere is He that which critical theology wished to make Him, namely a natural man, an historic individual "

[42] Compare J Burckhardt's letter to Albert Brenner (pub by Hans Brenner in the Basle *Jahrbuch*, 1901) "I have absolutely nothing stored away for the special interpretation of Faust You are well provided with commentaries of all sorts Hark! let us at once take the whole foolish pack back to the reading-room from whence they have come What you are destined to find in Faust, that you will find by intuition Faust is nothing else than pure and legitimate myth, a great primitive conception, so to speak, in which every one can divine in his own way his own nature and destiny Allow me to make a comparison What would the ancient Greeks have said had a commentator interposed himself between them and the *Oedipus legend*? There was a chord of the Oedipus legend in every Greek which longed to be touched directly and respond in its own way. And thus it is with the German nation and Faust"

[44] I will not conceal the fact that for a time I was in doubt whether I dare venture to reveal through analysis the intimate personality which the author, with a certain unselfish scientific interest, has exposed to public view Yet it seemed to me that the writer would possess an understanding deeper than any objections of my critics There is always some risk when one exposes one's self to the world The absence of any personal relation with Miss Miller permits me free speech, and also exempts me from those considerations due woman which are prejudicial to conclusions The person of the author is on that account just as shadowy to me as are her phantasies, and, like Odysseus, I have tried to let this phantom drink only enough blood to enable it to speak and in so doing betray some of the secrets of the inner life

I have not undertaken this analysis, for which the author owes me but little thanks for the pleasure of revealing private and intimate matters,

with the accompanying embarrassment of publicity, but because I wished to show the secret of the individual as one common to all

CHAPTER II

[1] A very beautiful example of this is found in C A Bernoulli "Franz Overbeck und Friedrich Nietzsche Eine Freundschaft," 1908 (Pt I, p 72) This author depicts Nietzsche's behaviour in Basle society "Once at a dinner he said to the young lady at his side, 'I dreamed a short time ago that the skin of my hand, which lay before me on the table, suddenly became like glass, shiny and transparent, through which I saw distinctly the bones and the tissues and the play of the muscles All at once I saw a toad sitting on my hand and at the same time I felt an irresistible compulsion to swallow the beast I overcame my terrible aversion and gulped it down.' The young lady laughed 'And do you laugh at that?' Nietzsche asked, his deep eyes fixed on his companion, half questioning, half sorrowful The young lady knew intuitively that she did not wholly understand that an oracle had spoken to her in the form of an allegory and that Nietzsche had revealed to her a glimpse into the dark abyss of his inner self" On page 166 Bernoulli continues as follows "One can perhaps see, behind that harmless pleasure of faultless exactness in dress, a dread of contamination arising from some mysterious and tormenting disgust"

Nietzsche went to Basle when he was very young, he was then just at the age when other young people are contemplating marriage Seated next to a young woman, he tells her that something terrible and disgusting is taking place in his transparent hand, something which he must take completely into his body We know what illness caused the premature ending of Nietzsche's life It was precisely this which he would tell the young lady and her laughter was indeed discordant

[2] A while series of psychoanalytic experiences could easily be produced here to illustrate this statement

[3] Ferenczi "Introjektion und Übertragung," *Jahrbuch*, Pt I (1912)

CHAPTER III

[1] The choice of words and comparisons is always significant A psychology of travels and the unconscious forces co-operating with them is yet to be written.

[2] This mental disturbance had until recently the very unfortunate designation, Dementia Praecox, given by Kraepelin It is extremely unfortunate that this malady should have been discovered by the psychiatrists, for its apparently bad prognosis is due to this circumstance Dementia praecox is synonymous with therapeutic hopelessness How would hysteria appear if judged from the standpoint of psychiatry! The psychiatrist naturally sees in the institutions only the worst cases of dementia praecox, and as a consequence of his therapeutic helplessness he must be a pessimist How deplorable would tuberculosis appear if the physician of an asylum for the incurable described the nosology of this disease! Just as little as the chronic cases of hysteria, which gradually degenerate in insane asylums, are characteristic of real hysteria, just so little are the cases of dementia praecox in asylums characteristic of those early forms so frequent in general practice, and which Janet has described under the name of Psychasthenia These cases fall under Bleuler's description of Schizophrenia, a name which connotes a psychological fact, and might easily be compared with similar facts in hysteria The term which I use in my private work for these conditions is Introversion

Neurosis, by which, in my opinion, the most important characteristic of this condition is given, namely the predominance of introversion over transference, which latter is the characteristic feature of hysteria.

In my "Psychology of Dementia Praecox" I have not made any study of the relationship of the Psychasthenia of Janet. Subsequent experience with Dementia Praecox, and particularly the study of psychasthenia in Paris, have demonstrated to me the essential relationship of Janet's group with the Introversion Neuroses (the Schizophrenia of Bleuler).

[3] Compare the similar views in my article, "Über die Psychologie der Dementia praecox," Halle 1907, and "Inhalt der Psychose," Deuticke, Wien 1908. Also Abraham: "Die psychosexuellen Differenzen der Hysterie und der Dementia praecox," *Zentralblatt für Nervenheilkunde und Psychiatrie*, 1908. This author, in support of Freud, defines the chief characteristic of dementia praecox as Autoerotism, which as I have asserted is only one of the results of Introversion.

[4] Freud, to whom I am indebted for an essential part of this view, also speaks of "Heilungsversuch," the attempt toward cure, the search for health.

[5] Miss Miller's publication gives no hint of any knowledge of psychoanalysis.

[6] Here I purposely give preference to the term "Imago" rather than to the expression "Complex," in order, by the choice of terminology, to invest this psychological condition, which I include under "Imago," with living independence in the psychical hierarchy, that is to say, with that autonomy which, from a large experience, I have claimed as the essential peculiarity of the emotional complex. (Compare "The Psychology of Dementia Praecox.") My critics, Isserlin especially, have seen in this view a return to medieval psychology, and they have, therefore, rejected it utterly. This "return" took place on my part consciously and intentionally, because the phantastic, projected psychology of ancient and modern superstition, especially demonology, furnishes exhaustive evidence for this point of view. Particularly interesting insight and confirmation is given us by the insane Schreber in an autobiography ("Denkwürdigkeiten eines Nervenkranken," Mutze, Leipzig), where he has given complete expression to the doctrine of autonomy.

Imago has a "significance similar on the one hand to the psychologically conceived creation in Spitteler's novel "Imago," and upon the other hand to the ancient religious conception of "imagines et lares."

[7] Compare my article, "Die Bedeutung des Vaters für das Schicksal des Einzelnen."

[8] As is well known, Anaxagoras developed the conception that the living primal power (Urpotenz) of νοῦς (mind) imparts movement, as if by a blast of wind, to the dead primal power (Urpotenz) of matter. There is naturally no mention of sound. This νοῦς, which is very similar to the later conception of Philo, the λόγος σπερματικός of the Gnostics and the Pauline πνεῦμα (spirit) as well as to the πνεῦμα of the contemporary Christian theologians, has rather the old mythological significance of the fructifying breath of the winds, which impregnated the mares of Lusitania, and the Egyptian vultures. The animation of Adam and the impregnation of the Mother of God by the πνεῦμα are produced in a similar manner. The infantile incest phantasy of one of my patients reads: "the father covered her face with his hands and blew into her open mouth."

[9] Haydn's "Creation" might be meant.

[10] See Job xvi: 1-11.

[11] I recall the case of a young insane girl who continually imagined that her innocence was suspected, from which thought she would not allow herself to be dissuaded. Gradually there developed out of her defensive attitude a correspondingly energetic positive erotomania.

[12] Compare the preceding footnote with the text of Miss Miller's

[13] The case is published in "Zur Psychologie und Pathologie sogenannter okkulter Phänomene" Mutze, Leipzig 1902

[14] Compare Freud's "Analyse der Phobie eines fünfjährigen Knaben," *Jahrbuch*, Vol I, 1st half, also Jung "Konflikte der kindlichen Seele," *Jahrbuch*, II, Vol I

[15] Others do not make use of this step, but are directly carried away by Eros

[16] "La sagasse et la destinée"

[17] This time I shall hardly be spared the reproach of mysticism But perhaps the facts should be further considered, doubtless the unconscious contains material which does not rise to the threshold of consciousness The analysis dissolves these combinations into their historical determinants, for it is one of the essential tasks of analysis to render impotent by dissolution the content of the complexes competing with the proper conduct of life Psychoanalysis works backwards like the science of history Just as the largest part of the past is so far removed that it is not reached by history, so too the greater part of the unconscious determinants is unreachable History, however, knows nothing of two kinds of things, that which is hidden in the past and that which is hidden in the future Both perhaps might be attained with a certain probability, the first as a postulate, the second as an historical prognosis In so far as to-morrow is already contained in to-day and all the threads of the future are in place, so a more profound knowledge of the past might render possible a more or less far-reaching and certain knowledge of the future Let us transfer this reasoning, as Kant has already done, to psychology Then necessarily we must come to the same result Just as traces of memory long since fallen below the threshold of consciousness are accessible in the unconscious, so too there are certain very fine subliminal combinations of the future, which are of the greatest significance for future happenings in so far as the future is conditioned by our own psychology But just so little as the science of history concerns itself with the combinations for the future, which is the function of politics, so little, also, are the psychological combinations for the future the object of analysis, they would be much more the object of an infinitely refined psychological synthesis, which attempts to follow the natural current of the libido This we cannot do, but possibly this might happen in the unconscious, and it appears as if from time to time, in certain cases, significant fragments of this process came to light, at least in dreams. From this comes the prophetic significance of the dream long claimed by superstition

The aversion of the scientific man of to-day to this type of thinking, hardly to be called phantastic, is merely an overcompensation to the very ancient and all too great inclination of mankind to believe in prophesies and superstitions

[18] Dreams seem to remain spontaneously in the memory just so long as they give a correct résumé of the psychologic situation of the individual

[19] How paltry are the intrinsic ensemble and the detail of the erotic experience, is shown by this frequently varied love song which I quote in its epirotic form

EPIROTIC LOVE SONG

(*Zeitschrift des Vereines fur Volkskunde*, XII, p 159)

O Maiden, when we kissed, then it was night, who saw us ?
A night Star saw us, and the moon,
And it leaned downward to the sea, and gave it the tidings,
Then the Sea told the rudder the rudder told the sailor,
The sailor put it into song, then the neighbor heard it,

Then the priest heard it and told my mother,
From her the father heard it; he got into a burning anger.
They quarrelled with me and commanded me and they have forbidden me
Ever to go to the door, ever to go to the window
And yet I will go to the window as if to my flowers
And never will I rest till my beloved is mine

[20] Job xli 13 (Leviathan)

" 21 His breath kindleth coals, and a flame goeth out of his mouth
" 22 In his neck remaineth strength, and sorrow is turned into joy before him
" 24 His heart is as firm as a stone, yea, as hard as a piece of the nether millstone
" 25 When he raiseth up himself, the mighty are afraid by reason of breakings they purify themselves
" 33 Upon earth there is not his like who is made without fear
" 34 He beholdeth all high things he is a king over all the children of pride"

Chapter xlii

" 1 Then Job answered the Lord, and said,
" 2 I know that thou canst do everything, and that no thought can be withholden from thee"

[21] The theriomorphic attributes are lacking in the Christian religion except as remnants, such as the Dove, the Fish and the Lamb. The latter is also represented as a Ram in the drawings in the catacombs. Here belong the animals associated with the Evangelists which particularly need historical explanation. The Eagle and the Lion were definite degrees of initiation in the Mithraic mysteries. The worshippers of Dionysus called themselves βόες because the god was represented as a bull. The maidens of Artemis, conceived of it as a she-bear. The Angel might correspond to the ἡλιόδρομοι of the Mithras mysteries. It is indeed an exquisite invention of the Christian phantasy that the animal coupled with St. Anthony is the pig, for the good saint was one of those who were subjected to the devil's most evil temptations.

[22] Compare Pfister's notable article: "Die Frömmigkeit des Grafen Ludwig von Zinzendorf." Wien 1910.

[23] The Book of Job, originating at a later period under non-Jewish influences, is a striking presentation of individual projection psychology.

[24] "If we say we have no sin, we deceive ourselves, and the truth is not in us" (I John i 8).

[25] "Surely he has borne our griefs and carried our sorrows" (Isaiah liii 4).

[26] "Bear ye one another's burdens" (Galatians vi 2).

[27] God is Love, corresponding to the platonic "Eros" which unites humanity with the transcendental.

[28] Compare Reitzenstein ("Die hellenistischen Mysterienreligionen," Leipzig and Berlin 1910, p 20): "Among the various forms with which a primitive people have represented the highest religious consecration, union with God, belongs necessarily that of the sexual union, in which man attributes to his semen the innermost nature and power of God. That which was in the first instance wholly a sensual act becomes in the most widely separated places, independently, a sacred act, in which the god is represented by a human deputy or his symbol the Phallus."

[29] Take as an example among many others the striking psychologic description of the fate of Alypius, in the "Confessions" of St Augustine (Bk VI, Ch 7): "Only the moral iniquity of Carthage, expressed in the absolute wildness of its worthless spectacle had drawn him down into the whirlpool of this misery. (Augustine, at that time a teacher of Logic,

through his wisdom had converted Alypius] He rose up after those words from the depths of the mire, into which he had willingly let himself be submerged, and which had blinded him with fatal pleasure He stripped the filth from off his soul with courageous abstemiousness All the snares of the Hippodrome no longer perplexed him Thereupon Alypius went to Rome in order to study law, there he became a backslider. He was transported to an unbelievable degree by an unfortunate passion for gladiatorial shows Although in the beginning he abominated and cursed these shows, one evening some of his friends and fellow-students, whom he met after they had dined, in spite of his passionate refusals and the exertion of all the power of his resistance, dragged him with friendly violence to the Amphitheatre on the occasion of a cruel and murderous exhibition At the time he said to them 'If you drag my body to that place and hold it there, can you turn my mind and my eyes to that spectacle ?' In spite of his supplications they dragged him with them, eager to know if he would be able to resist the spectacle When they arrived they sat down where place was still left, and all glowed with inhuman delight He closed his eyes, and forbade his soul to expose itself to such danger O, if he had also stopped up his ears ! When some one fell in combat and all the people set up a mighty shout, he stifled his curiosity and prepared proudly to scorn the sight, confident that he could view the spectacle if he so desired And his soul was overcome with terrible wounds, like the wounds of the body which he desired to see, and souls more miserable than the one whose fall had caused the outcry, which pressing through his ears, had opened his eyes, so that his weakness had been bared Through this he could be struck and thrown down, for he had the feeling of confidence more than strength, and he was weaker because he trusted himself to this and not to Thee When he saw the blood, then at the same time he drew in the desire for blood, and no longer turned away but directed his looks thither The fury took possession of him and yet he did not know it, he took delight in the wicked combat and was intoxicated by the bloody pleasure Now he was no longer the same as when he had come, and he was the true accomplice of those who first had dragged him there What more is there to say ? He saw, he cried out, he was inflamed, and he carried away with him the insane longing, which enticed him again to return, not only in the company of those who first had dragged him with them, but going ahead of all and leading others "

[30] Compare the prayer of the so-called Mithraic Liturgy (pub by Dieterich) There, characteristic places are to be found, such for instance as τῆς ἀνθρωπίνης μου ψυχικῆς δυνάμεως ἣν ἐγὼ πάλιν μεταπαραλήψομαι μετὰ τὴν ἐνεστῶσαν καὶ κατεπείγουσάν με πικρὰν ἀνάγκην ἀχρεοκόπητον (The human soul force which I, weighed down by guilt, would again attain, because of the present bitter need oppressing me) ἐπικαλοῦμαι ἕνεκα τῆς κατεπειγούσης καὶ πικρᾶς ἀπαραιτήτου ἀνάγκης (On account of the oppressing bitter and inexorable need)

From the speech of the High Priest (Apuleius "Metamorphoses" lib XI, 248) a similar train of thought may be gathered The young philosopher Lucius was changed into an ass, that continuously rutting animal which Isis hated. Later he was released from the enchantment and initiated into the mysteries of Isis. When he was freed from the spell the priest speaks as follows "Lubrico virentis aetatulae, ad serviles delapsus voluptates, curiositatis improsperae sinistrum praemium reportasti —Nam in eos, quorum sibi vitas servitium Deae nostrae majestas vindicavit, non habet locum casus infestus—in tutelam jam receptus es Fortunae, sed videntis" (But falling into the slavery of pleasure, in the wantonness of buxom youth, you have reaped the inauspicious reward of your ill-fated curiosity—for direful calamity has no power over those whose lives the majesty of our Goddess has claimed for her own service.—You are now received under the guardianship of fortune, but of a fortune who can see) In the prayer to the Queen of Heaven, Isis, Lucius says "Qua fatorum etiam inextricabiliter contorta retractas licia et Fortunae tempestates mitigas, et stellarum noxios meatus cohibes" (By

which thou dost unravel the inextricably entangled threads of the fates, and dost assuage the tempests of fortune and restrain the malignant influences of the stars —Generally it was the purpose of the rite to destroy the " evil compulsion of the star " by magic power

The power of fate makes itself felt unpleasantly only when everything goes against our will, that is to say when we no longer find ourselves in harmony with ourselves As I endeavoured to show in my article, " Die Bedeutung des Vaters," etc, the most dangerous power of fate lies in the infantile libido fixation, localized in the unconscious The power of fate reveals itself at closer range as a compulsion of the libido, wherefore Maeterlinck justly says that a Socrates could not possibly be a tragic hero of the type of Hamlet In accordance with this conception the ancients had already placed εἱμαρμένη (destiny) in relation to " Primal Light," or " Primal Fire " In the Stoic conception of the primal cause, the warmth spread everywhere, which has created everything and which is therefore Destiny (Compare Cumont " Mysterien des Mithra," p 83) This warmth is, as will later be shown, a symbol of the libido Another conception of the Ananke (necessity) is, according to the Book of Zoroaster, περὶ φύσεως (concerning nature), that the air as wind had once a connection with fertility I am indebted to Rev. Dr Keller of Zurich for calling my attention to Bergson's conception of the " durée créatrice "

[31] Schiller says in " Wallenstein " " In your breast lie the constellations of your fate " " Our fates are the result of our personality," says Emerson in his " Essays " Compare with this the remarks in " Die Bedeutung des Vaters "

[32] The ascent to the " Idea " is described with unusual beauty in Augustine (Bk X, Ch 8) The beginning of Ch 8 reads " I will raise myself over this force of my nature, step by step ascending to Him who has made me. I will come to the fields and the spacious palaces of my memory "

[33] The followers of Mithra also called themselves Brothers In philosophical speech Mithra was Logos emanating from God (Cumont " Myst des Mithra," p 102)

Besides the followers of Mithra there existed many Brotherhoods which were called Thiasai and probably were the organizations from which the Church developed later (A Kalthoff " Die Entstehung des Christentums ")

[34] Augustine, who stood in close relation to that period of transition not only in point of time but also intellectually, writes in his " Confessions " (Bk. VI, Ch 16)

" Nor did I, unhappy, consider from what source it sprung, that even on these things, foul as they were, I with pleasure discoursed with my carnal pleasures And yet these friends I loved for themselves only, and friends, nor could I, even according to the notions I then had of happiness, be happy without friends, amid what abundance soever of I felt that I was beloved of them for myself only O, crooked paths ! Woe to the audacious soul, which hoped, by forsaking Thee, to gain some better thing ! Turned it hath, and turned again, upon back, sides and belly, yet all was painful, and Thou alone rest ! " (Trans by Pusey)

It is not only an unpsychologic but also an unscientific method of procedure to characterize offhand such effects of religion as suggestion Such things are to be taken seriously as the expression of the deepest psychologic need

[35] Both religions teach a pronounced ascetic morality, but at the same time a morality of action The last is true also of Mithracism Cumont says that Mithracism owed its success to the value of its morale. " This stimulated to action in an extraordinary degree " (" Myst des Mithra "). The followers of Mithra formed a " sacred legion " for battle against evil, and among them were virgins (nuns) and continents (ascetics) Whether these brotherhoods had another meaning—that is, an economic-communistic

one—is something I will not discuss now Here only the religious-psychologic aspects interest us Both religions have in common the idea of the divine sacrifice Just as Christ sacrificed himself as the Lamb of God, so did Mithra sacrifice his Bull This sacrifice in both religions is the heart of the Mysteries The sacrificial death of Christ means the salvation of the world, from the sacrifice of the bull of Mithra the entire creation springs

[36] This analytic perception of the roots of the Mystery Religions is necessarily one-sided, just as is the analysis of the basis of the religious poem In order to understand the actual causes of the repression in Miss Miller one must delve into the moral history of the present, just as one is obliged to seek in the ancient moral and economic history the actual causes of repression which have given rise to the Mystery cults This investigation has been brilliantly carried out by Kalthoff (See his book, " Die Entstehung des Christentums," Leipzig 1904) I also refer especially to Pohlmann's " Geschichte des antiken Kommunismus und Sozialismus", also to Bücher: " Die Aufstände der unfreien Arbeiter 143 bis 129 v Chr," 1874

The other cause of the enormous introversion of the libido in antiquity is probably to be found in the fact that an unbelievably large part of the people suffered in the wretched state of slavery It is inevitable that finally those who bask in good fortune would be infected in the mysterious manner of the unconscious, by the deep sorrow and still deeper misery of their brothers, through which some were driven into orgiastic furies Others, however, the better ones, sank into that strange world-weariness and satiety of the intellectuals of that time Thus from two sources the great introversion was made possible,

[37] Compare Freud. " The Interpretation of the Dream "

[38] Compare Freud: " Sublimation," in "Three Contributions to the Sexual Theory."

[39] In a manner which is closely related to my thought, Kalthoff ("Entstehung des Christentums") understands the secularizing of the religious interest as a new incarnation of the λόγος (word) He says. " The profound grasp of the soul of nature evidenced in modern painting and poetry, the living intuitive feeling which even science in its most austere works can no longer do without, enables us easily to understand how the Logos of Greek philosophy which assigned its place in the world to the old Christ type, clothed in its world-to-come significance celebrated a new incarnation "

[40] It seems, on account of the isolation of the cult, that this fact was the cause of its ruin as well, because the eyes of that time were blinded to the beauty of nature Augustine (Bk X, Ch 6) very justly remarks " But they [men] were themselves undone through love for her [creation] "

[41] Augustine (ibid). " But what do I love when I love Thee, O God? Not the bodily form, nor the earthly sweetness, not the splendour of the light, so dear to these eyes, nor the sweet melodies of the richly varied songs; not the flowers and the sweet scented ointments and spices of lovely fragrance; not manna and honey; not the limbs of the body whose embraces are pleasant to the flesh I do not love these when I love my God, and yet the light, the voice, the fragrance, the food, the embrace of my inner man; when these shine into my soul, which no space contains, which no time takes away, where there is a fragrance which the wind does not blow away, where there is a taste which no gluttony diminishes and where harmony abides which no satiety can remove—that is what I love, when I love my God" (Perhaps a model for Zarathustra " Die sieben Siegel," Nietzsche's works, VI, p 33 ff)

[42] Cumont " Die Mysterien des Mithra Ein Beitrag zur Religionsgeschichte der romischen Kaiserzeit" Übersetzt von Gehrich, Leipzig 1903, p 109

[43] 41st Letter to Lucilius.

[44] Ibid

CHAPTER IV

[1] Complexes are apt to be of the greatest stability, although their outward forms of manifestation change kaleidoscopically A large number of experimental studies have entirely convinced me of this fact

[2] Julian the Apostate made the last, unsuccessful attempt to cause the triumph of Mithracism over Christianity

[3] This solution of the libido problem was brought about in a similar manner by the flight from the world during the first Christian century (The cities of the Anchorites in the deserts of the Orient) People mortified themselves in order to become spiritual and thus escape the extreme brutality of the decadent Roman civilization Asceticism is forced sublimation, and is always to be found where the animal impulses are still so strong that they must be violently exterminated The masked self-murder of the ascetic needs no further biologic proof
Chamberlain ("Foundations of the Nineteenth Century") sees in the problem a biologic suicide because of the enormous amount of illegitimacy among Mediterranean peoples at that time I believe that illegitimacy tends rather to mediocrity and to living for pleasure. It appears after all that there were, at that time, fine and noble people who, disgusted with the frightful chaos of that period which was merely an expression of the disruption of the individual, put an end to their lives, and thus caused the death of the old civilisation with its endless wickedness

[4] Δίκη (Justice), daughter of Zeus and Themis, who, after the Golden Age, forsook the degenerate earth

[5] Thanks to this eclogue, Virgil later attained the honor of being a semi-Christian poet To this he owes his position as guide to Dante.

[6] Both are represented not only as Christian, but also as Pagan Essener and Therapeuten were quasi orders of the Anchorites living in the desert Probably, as, for instance, may be learned from Apuleius ("Metamorphoses," lib XI), there existed small settlements of mystics or consecrated ones around the sacred shrines of Isis and Mithra Sexual abstinence and celibacy were also known

[7] "Below the hills, a marshy plain
Infects what I so long have been retrieving:
This stagnant pool likewise to drain
Were now my latest and my best achieving.
To many millions following let me furnish soil"

The analogy of this expression with the quotation above is striking

[8] Compare Breuer and Freud. "Studien uber Hysterie", also Bleuler: "Die Psychoanalyse Freuds," *Jahrbuch*, 1910, Vol II, 2nd half

[9] Faust (in suicide monologue).

"Out on the open ocean speeds my dreaming!
The glassy flood before my feet is gleaming!
A new day beckons to a newer shore!

A fiery chariot, borne on buoyant pinions,
Sweeps near me now; I soon shall ready be
To pierce the ether's high, unknown dominions,
To reach new spheres of pure activity!
This godlike rapture, this supreme existence
Do I, but now a worm, deserve to track?
Yes, resolute to reach some brighter distance;
On earth's fair sun I turn my back!

. . .

Ah, that no wing can lift me from the soil,
Upon its tract to follow, follow soaring !
Then would I see eternal Evening gild
The silent world beneath me glowing

. .

And now before mine eyes expands the ocean,
With all its bays in shining sleep !

.

The newborn impulse fires my mind,
I hasten on, his beams eternal drinking "

We see it is the same longing and the same sun

[10] Compare Jung "Diagnost Assoc Stud.", also "The Psychology of Dementia Praecox," Chs II and III

[11] According to the Christian conception *God is Love*

[12] Apuleius ("Met," lib XI, 257) "At manu dextera gerebam flammis adultam facem, et caput decora corona cinxerat palmae candidae foliis in modum radiorum prosistentibus Sic ad instar solis exornato et in vicem simulacri constituto" (Then in my right hand I carried a burning torch, while a graceful chaplet encircled my head, the shining leaves of the palm tree projecting from it like rays of light Thus arrayed like the sun, and placed so as to resemble a statue).

[13] The parallel in the Christian mysteries is the crowning with the crown of thorns, the exhibition and mocking of the Saviour

[14] In the same way the Sassanian Kings called themselves "Brothers of the Sun and of the Moon" In Egypt the soul of every ruler was a reduplication of the Sun Horus, an incarnation of the sun

[15] "The rising at day out of the Underworld." Erman. "Aegypten," p. 409.

[16] Compare the coronation above Feather, a symbol of power Feather crown, a crown of rays, halo Crowning, as such, is an identification with the sun For example, the spiked crown upon the Roman coins made its appearance at the time when the Cæsars were identified with *Sol invictus* ("Solis invicti comes") The halo is the same, that is to say, an image of the sun, just as is the tonsure The priests of Isis had smooth-shaven heads like stars (See Apuleius, "Metamorphoses")

[17] Compare with this my statements in "Über die Bedeutung des Vaters für das Schicksal des Einzelnen" Deuticke, Wien

[18] In the text of the so called Mithra Liturgy are these lines "'Εγώ εἰμι σύμπλανος ὑμῖν ἀστὴρ καὶ ἐκ τοῦ βάθους ἀναλάμπων—ταῦτά σου εἰπόντος εὐθέως ὁ δίσκος ἀπλωθήσεται" (I am a star wandering about with you and flaming up from the depths When thou hast said this, immediately the disc of the sun will unfold) The mystic through his prayers implored the divine power to cause the disc of the sun to expand In the same way Rostand's "Chantecler" causes the sun to rise by his crowing

"For verily I say unto you, If ye have faith as a grain of mustard seed, ye shall say unto this mountain, Remove hence to yonder place, and it shall remove, and nothing shall be impossible unto you" Matthew xvii 20).

[19] Compare especially the words of the Gospel of John: "I and my Father are one" (John x 30) "He that hath seen me hath seen the Father" (John xiv 9) "Believe me that I am in the Father, and the Father in me" (John xiv, 11) "I came forth from the Father, and am come into the world, again, I leave the world, and go to the Father" (John xvi 28) "I ascend unto my Father, and your Father, and to my God, and your God" (John xx 17)

[20] See the footnote on p 137 of text

[21] Two-bodied an obscure epithet, if one does not admit that the dual life of the redeemed, taught in the mysteries of that time, was attributed to God, that is to say, to the libido Compare the Pauline conception of the σῶμα σαρκικόν and πνευματικόν (carnal and spiritual body) In the Mithraic worship, Mithra seems to be the divine spirit, while Helios is the material god, to a certain extent the visible lieutenant of the divinity Concerning the confusion between Christ and Sol, see below

[22] Compare Freud "Three Contributions to the Sexual Theory"

[23] Renan ("Dialogues et fragments philosophiques," p 168) says "Before religion had reached the stage of proclaiming that God must be put into the absolute and ideal, that is to say, beyond this world, one worship alone was reasonable and scientific that was the worship of the sun"

[24] Buber "Ekstat Konfess" p 51 and on

[25] "Liebesgesänge an Gott," cited by Buber "Ekstat Konfess," p 40 An allied symbolism is found in Carlyle. "The great fact of existence is great to him. Fly as he will, he can not get out of the awful presence of this reality His mind is so made, he is great by that first of all Fearful and wonderful, real is life, real is death, is this universe to him Though all men should forget its truth, and walk in a vain show, he can not At all moments the Flame image glares in upon him" ("Heroes and Hero-Worship")

One can select from literature at random For example, S Friedländer (Berlin-Halensee) says in *Jugend*, 1910, No 35, p 823 "Her longing demands from the beloved only the purest Like the sun, it burns to ashes with the flame of excessive life, which refuses to be light," and so on

[26] Buber Ibid, p 45

[27] I emphasize this passage because its idea contains the psychological root of the "Wandering of the soul in Heaven," the conception of which is very ancient It is a conception of the wandering sun which from its rising to its setting wanders over the world The wandering gods are representations of the sun, that is, symbols of the libido This comparison is indelibly impressed in the human phantasy as is shown by the poem of Wesendonck

GRIEF

The sun, every evening weeping,
Reddens its beautiful eyes for you;
When early death seizes you,
Bathing in the mirror of the sea

Still in its old splendour
The glory rises from the dark world;
You awaken anew in the morning
Like a proud conqueror

Ah, why then should I lament,
When my heart, so heavy, sees you?
Must the sun itself despair?
Must the sun set?

And does death alone bear life?
Do griefs alone give joys?
O, how grateful I am that
Such pains have given me nature!

Another parallel is in the poem of Ricarda Huch:

As the earth, separating from the sun,
Withdraws in quick flight into the stormy night,

Starring the naked body with cold snow,
Deafened, it takes away the summer joy
And sinking deeper in the shadows of winter,
Suddenly draws close to that which it flees,
Sees itself warmly embraced with rosy light
Leaning against the lost consort
Thus I went, suffering the punishment of exile,
Away from your countenance, into the ancient place.
Unprotected, turning to the desolate north,
Always retreating deeper into the sleep of death
And then would I awake on your heart,
Blinded by the splendour of the dawn

[28] The whistling and snapping is a tasteless, archaic relic, an allurement for the theriomorphic divinity, probably also an infantile reminiscence (quieting the child by whistling and snapping) Of similar significance is the roaring at the divinity ("Mithr Lit," p. 13) "You are to look at him and give forth a long roar, as with a horn, using all your breath, pressing your sides, and kiss the amulet etc." "My soul roars with the voice of a hungry lion," says Mechthild von Magdeburg "As the hart panteth after the water brooks, so panteth my soul after God"—Psalms xlii 2 The ceremonial custom, as so often happens, has dwindled into a figure of speech. Dementia praecox, however, revivifies the old custom, as in the "Roaring miracle" of Schreber See the latter's "Denkwürdigkeiten eines Nerven kranken," by which he demands that God, i e the Father, so inadequately oriented with humanity, take notice of his existence

The infantile reminiscence is clear, that is, the childish cry to attract the attention of the parent to himself the whistling and smacking for the allure ment of the theriomorphic attribute, the "helpful animal" (See Rank: 'The Myth of the Birth of the Hero")

[29] The water-god Sobk, appearing as a crocodile, was identified with Rê.

[30] Erman: "Aegypten," p. 354

[31] Erman: Ibid, p 355

[32] Compare above ἀστέρας πενταδακτυλιαίους ("five-fingered stars").

[33] The bull Apis is a manifestation of Ptah. The bull is a well known symbol of the sun

[34] Amon

[35] Sobk of Faijum

[36] The God of Dedu in the Delta, who was worshipped as a piece of wood. (Phallic)

[37] This reformation, which was inaugurated with much fanaticism, soon broke down

[38] Apuleius, "Met," lib XI, p. 239.

[39] It is noteworthy that the humanists too (I am thinking of an expression of the learned Mutianus Rufus) soon perceived that antiquity had but two gods, that is, a masculine god and a feminine god

[40] Not only was the light—or fire substance ascribed to the divinity but also to the soul, as for example in the system of Mâni, as well as among the Greeks, where it was characterized as a fiery breath of air The Holy Ghost of the New Testament appears in the form of flames around the heads of the Apostles, because the πνεῦμα was understood the mean "fiery" (Dieterich. Ibid, p 116) Very similar is the Iranian conception of Hvarenô, by which is meant the "Grace of Heaven" through which a monarch rules By "Grace" is understood a sort of fire or shining glory, something very substantial (Cumont: Ibid, p 70) We come across conceptions allied in character in Kerner's "Seherin von Prevorst," and in the case published

by me, "Psychologie und Pathologie sogenannter occulter Phänomene Here not only the souls consist of a spiritual light-substance, but the entire world is constructed according to the white black system of the Manichæans —and this by a fifteen-year-old girl ! The intellectual over accomplishment which I observed earlier in this creation, is now revealed as a consequence of energetic introversion, which again roots up deep historical strata of the soul and in which I perceive a regression to the memories of humanity condensed in the unconscious

[41] I add to this a quotation from Firmicus Maternus (Mathes I, 5, 9, cit by Cumont, "Textes et Monuments," I, p 40) "Cui (animo) descensus per orbem solis tribuitur" (To this spirit the descent through the orb of the sun is attributed)

[42] St Hieronymus remarks, concerning Mithra who was born in a miraculous manner from a rock, that this birth was the result of "solo aestu libidinis" (merely through the heat of the libido) (Cumont "Textes et Monuments," I, p 163)

[43] Mead "A Mithraic Ritual" London 1907, p 22

[44] I am indebted to my friend and co worker, Dr. Riklin, for the knowledge of the following case which presents an interesting symbolism It concerns a paranoic who passed over into a manifest megalomaniac in the following way: She suddenly saw a *strong light*, a *wind blew* upon her, she felt as if "her heart turned over," and from that moment she knew that God had visited her and was in her

I wish to refer here to the interesting correlation of mythological and pathological forms disclosed in the analytical investigation of Dr S Spielrein, and expressly emphasize that she has discovered the symbolisms presented by her in the *Jahrbuch*, through independent experimental work, in no way connected with my work

[45] According to the Chaldean teaching the sun occupies the middle place in the choir of the seven planets

[46] The Great Bear consists of seven stars

[47] Mithra is frequently represented with a knife in one hand and a torch in the other The knife as an instrument of sacrifice plays an important rôle in his myth

[48] Ibid

[49] Compare with this the scarlet mantle of Helios in the Mithra liturgy It was a part of the rites of the various cults to be dressed in the bloody skins of the sacrificial animals, as in the Lupercalia, Dionysia and Saturnalia, the last of which has bequeathed to us the Carnival, the typical figure of which, in Rome was the priapic Pulcinella

[50] Compare the linen-clad retinue of Helios Also the bull headed gods wear white περιζώματα (aprons)

[51] The title of Mithra in Vendidad XIX, 28, cit by Cumont "Textes et Monuments," p 37

[52] The development of the sun symbol in Faust does not go as far as an anthropomorphic vision It stops in the suicide scene at the chariot of Helios ("A fiery chariot borne on buoyant pinions sweeps near me now") The fiery chariot comes to receive the dying or departing hero, as in the ascension of Elijah or of Mithra (Similarly Francis of Assisi) In his flight Faust passes over the sea, just as does Mithra The ancient Christian pictorial representations of the ascension of Elijah are partly founded upon the corresponding Mithraic representations The horses of the sun chariot rushing upwards to Heaven leave the solid earth behind, and pursue their course over a water god, Oceanus, lying at their feet (Cumont "Textes et Monuments" Bruxelles 1899, I p 178)

[53] Compare my article, "Psych. und Path sog. occ Phän."

[54] Quoted from Pitra "Analecta sacra," cit by Cumont "Textes et Monuments," p. 355

[55] Cited from Usener. "Weihnachtsfest," p 5

[56] The passage from Malachi is found in chap. iv, 2: "But unto you that fear my name shall the Sun of Righteousness arise with healing in His wings" (feathers). This figure of speech recalls the Egyptian sun symbol

[57] Cumont. "Textes et Monuments," t. I p 255 *περὶ ἀστρονόμων*.

[58] The pictures in the Catacombs contain much symbolism of the sun The Swastika cross, for example—a well known image of the sun, wheel of the sun, or sun's feet—is found upon the garment of Fossor Diogenes in the cemetery of Peter and Marcellinus The symbols of the rising sun, the bull and the ram, are found in the Orpheus fresco of the cemetery of the holy Domitilla Similarly the ram and the peacock (which, like the phœnix, is the symbol of the sun) is found upon an epitaph of the Callistus Catacomb

[59] Compare the countless examples in Gorres "Die christliche Mystik"

[60] Compare Leblant "Sarcophages de la Gaule," 1880 In the 'Homilies" of Clement of Rome ("Hom," II, 23, cit by Cumont) it is said: *Τῷ κυρίῳ γεγονάσιν δώδεκα ἀπόστολοι τῶν τοῦ ἡλίου δώδεκα μηνῶν φέροντες τὸν ἀριθμόν* (The twelve apostles of the Lord, having the number of the twelve months of the sun) As is apparent, this idea is concerned with the course of the sun through the Zodiac Without wishing to enter upon an interpretation of the Zodiac, I mention that, according to the ancient view (probably Chaldean), the course of the sun was represented by a snake which carried the signs of the Zodiac on its back (similarly to the Leontocephalic God of the Mithra mysteries) This view is proven by a passage from a Vatican Codex edited by Cumont in another connection (190, saec. XIII, p 229, p 85) "*τοτε ὁ πάνσοφος δημιουργὸς ἄκρῳ νευματι ἐκίνησε τὸν μεγαν δράκοντα σὺν τῷ κεκοσμημένῳ στεφάνῳ, λέγω δὴ τὰ ἰβ' ζῴδια, βαστάζοντα ἐπὶ τοῦ νώτου αὐτοῦ*" (The all-wise maker of the world set in motion the great dragon with the adorned crown, with a command at the end I speak now of the twelve images borne on the back of this)

This inner connection of the *ζῴδια* (small images) with the zodiacal snake is worthy of notice and gives food for thought The Manichæan system attributes to Christ the symbol of the snake, and indeed of the snake on the tree of Paradise For this the quotation from John gives far-reaching justification (John iii 14) "And as Moses lifted up the serpent in the wilderness, even so must the son of man be lifted up" An old theologian, Hauff ("Biblische Real- und Verbalkonkordanz," 1834), makes this careful observation concerning this quotation "Christ considered the Old Testament story an unintentional symbol of the idea of the atonement." The almost bodily connection of the followers with Christ is well known (Romans xii 4). "For as we have many members in one body, and all members have not the same office, so we being many are one body in Christ, and every one members one of another" If confirmation is needed that the zodiacal signs are symbols of the libido, then the sentence in John i 29, "Behold the Lamb of God, which taketh away the sin of the world," assumes a significant meaning

[61] According to an eleventh century manuscript in Munich, Albrecht Wirth "Aus orientalischen Chroniken," p 151 Frankfurt 1894

[62] Abeghian "Der armenische Volksglaube," p 41, 1899

[63] Compare Aigremont "Fuss- und Schuhsymbolik," Leipzig 1909

[64] Attis was later assimilated with Mithra Like Mithra he was represented with the Phrygian cap (Cumont "Myst des Mith," p 65) According

to the testimony of Hieronymus, the manger (Geburtshohle) at Bethlehem was originally a sanctuary (Spelaeum) of Attis (Usener "Weihnachtsfest," p 283)

[65] Cumont ("Die Mysterien des Mithra" p 4) says of Christianity and Mithracism "Both opponents perceived with astonishment how similar they were in many respects, without being able to account for the causes of this similarity"

[66] Our present-day moral views come into conflict with this wish in so far as it concerns the erotic fate The erotic adventures necessary for so many people are often all too easily given up because of moral opposition and one willingly allows himself to be discouraged because of the social advantages of being moral

[67] The poetical works of Lord Byron

[68] Edmond Rostand "Cyrano de Bergerac" Paris 1898

[69] The projection into the "cosmic" is the primitive privilege of the libido, for it enters into our perception naturally through all the avenues of the senses, apparently from without, and in the form of pain and pleasure connected with the objects This we attribute to the object without further thought, and we are inclined, in spite of our philosophic considerations, to seek the causes in the object, which often has very little concern with it (Compare this with the Freudian conception of Transference, especially Firenczi's remarks in his paper, "Introjektion und Übertragung," *Jahrbuch*, Vol I, p 422) Beautiful examples of direct libido projection are found in erotic songs

> "Down on the strand, down on the shore,
> A maiden washed the kerchief of her lover,
> And a soft west wind came blowing over the shore,
> Lifted her skirt a little with its breeze
> And let a little of her ankles be seen,
> And the seashore became as bright as all the world"
>
> (Neo Grecian Folksong from Sanders, "Das Volksleben der Neugriechen," 1844, p 81, cit *Zeitscrift des Vereines fur Volkskunde*, Jahrgang XII, 1902, p 166)
>
> "In the farm of Gymir I saw
> A lovely maiden coming toward me,
> From the brilliance of her arm glowed
> The sky and all the everlasting sea"
>
> (From the Edda, tr (into Ger) by H Gering, p 53, *Zeitschrift fur Volskunde*, Jahrgang, XII, 1902, p 167)

Here, too, belong all the miraculous stories of cosmic events, phenomena occurring at the birth and death of heroes (The Star of Bethlehem, earthquakes, the rending asunder of the temple hangings etc, at the death of Christ) The omnipotence of God is the manifest omnipotence of the libido, the only actual doer of wonders which we know The symptom described by Freud, as the "omnipotence of thought" in Compulsion Neuroses arises from the "sexualizing" of the intellect The historical parallel for this is the magical omnipotence of the mystic, attained by introversion The "omnipotence of thought" corresponds to the identification with God of the paranoic, arrived at similarly through introversion

[70] Comparable to the mythological heroes who after their greatest deeds fall into spiritual confusion

[71] Here I must refer you to the blasphemous piety of Zinzendorf, which has been made accessible to us by the noteworthy investigation of Pfister

[72] Anah is really the beloved of Japhet, the son of Noah She leaves him because of the angel

[73] The one invoked is really a star Compare Miss Miller's poem.

[74] Really an attribute of the wandering sun.

[75] Compare Miss Miller's poem

"My poor life is gone,

———————————

——— then having gained
One raptured glance, I'll die content,
For I the source of beauty, warmth and life
Have in his perfect spendour once beheld"

[76] The light-substance of God

[77] The light-substance of the individual soul

[78] The bringing together of the two light-substances shows their common origin, they are the symbols of the libido Here they are figures of speech In earlier times they were doctrines According to Mechthild von Magdeburg the soul is made out of love ("Das fliessende Licht der Gottheit," herausgegeben von Escherich, Berlin 1909)

[79] Compare what is said above about the snake symbol of the libido The idea that the climax means at the same time the end, even death, forces itself here

[80] Compare the previously mentioned pictures of Stuck Vice, Sin and Lust, where the woman's naked body is encircled by the snake. Fundamentally it is a symbol of the most extreme fear of death. The death of Cleopatra may be mentioned here

[81] Encircling by the serpent.

PART II

CHAPTER I

[1] This is the way it appears to us from the psychological standpoint See below

[2] Samson as Sun god See Steinthal "Die Sage von Simson," *Zeitschrift fur Völkerpsychologie*, Vol II

[3] I am indebted for the knowledge of this fragment to Dr Van Ophuijsen of The Hague

[4] Rudra, properly father of the Maruts (winds), a wind or sun god, appears here as the sole creator God, as shown in the course of the text The role of creator and fructifier easily belongs to him as wind god I refer to the observations in Part I concerning Anaxagoras and to what follows

[5] This and the following passages from the Upanishads are quoted from: "The Upanishads," translated by R. G S Mead and J C Chatopâdhyâya London 1896

[6] In a similar manner, the Persian sun-god Mithra is endowed with an immense number of eyes

[7] Whoever has in himself, God, the sun, is immortal, like the sun Compare Pt I, Ch 5

[8] He was given that name because he had introduced the phallic cult into Greece In gratitude to him for having buried the mother of the serpents, the young serpents cleaned his ears, so that he became clairaudient and understood the language of birds and beasts

[9] Compare the vase picture of Thebes, where the Cabiri are represented in noble and in caricatured form (in Roscher: "Lexicon," s Megaloi Theoi).

[10] The justification for calling the Dactyli thumbs is given in a note in Pliny 37, 170, according to which there were in Crete precious stones of iron color and thumblike shape which were called Idaean Dactyli.

[11] Therefore, the dactylic metre or verse

[12] See Roscher "Lexicon of Greek and Roman Mythology," s. Dactyli.

[13] According to Jensen Kosmologie," p 292, Oannes Ea is the educator of men.

[14] Inman: "Ancient Pagan and Modern Christian Symbolism."

[15] Varro identifies the μεγάλοι θεοί with the Penates The Cabiri might be simulacra duo virilia Castoris et Pollucis in the harbour of Samothrace

[16] In Brasiae on the Laconian coast and in Pephnos some statues only a foot high with caps on their heads were found

[17] That the monks have again invented cowls seems of no slight importance

[18] *Zentralblatt für Psychoanalyse*, II, p 187

[19] The typical motive of the youthful teacher of wisdom has also been introduced into the Christ myth in the scene of the twelve-year-old Jesus in the temple

[20] Next to this, there is a female figure designated as ΚΡΑΤΕΙΑ, which means "one who brings forth" (Orphic)

[21] Roscher "Lexicon," s v Megaloi (Theoi)

[22] Roscher "Lexicon," s. v. Phales

[23] Compare Freud's evidence, *Zentralblatt fur Psychoanalyse*, I, p 188 I must remark at this place that etymologically penis and penates are not grouped together On the contrary, πεος, πόσθη, Sanskrit *pása-h* Latin *penis*, were given with the Middle High German *visel* (penis) and Old High German *fasel* the significance of fœtus, *proles*. (Walde "Latin Etymologie" s Penis)

[24] Stekel in his "Traumsymbolik" has traced out this sort of representation of the genitals, as has Spielrein also in a case of dementia praecox 1912 *Jahrbuch*, Vol III, p 369

[25] The figure of Κράτεια, the one who "brings forth," placed beside it is surprising in that the libido occupied in creating religion has apparently developed out of the primitive relation to the mother

[26] In Freud's paper ("Psychoanalytische Bemerkungen über einen Fall von Paranoia usw," 1912 *Jahrbuch*, Vol III, p 68), which appeared simultaneously with the first part of my book, he makes an observation absolutely parallel to the meaning of my remarks concerning the "libido theory" resulting from the phantasies of the insane Schreber Schreber's divine rays composed by condensation of sun's rays, nerve fibres and sperma are really nothing else but the libido fixations projected outside and objectively represented, and lend to his delusion a striking agreement with our theory That the world must come to an end because the ego of the patient attracts all the rays to himself, that later during the process of reconstruction he must be very anxious lest God sever the connection of the rays with him these and certain other peculiarities of Schreber's delusion sound very like the foregoing endopsychic perceptions, on the assumption of which I have based the interpretation of paranoia.

[27] Tuscalanarum quaestionum," lib IV.

[28] "Pro Quint," 14

[29] Walde "Latin Etymological Dictionary," 1910 See libet *Liberi* (children) is grouped together with *libet* by Nazari ("Riv di Fil," XXXVI, 573) Could this be proven, then Liber, the Italian god of procreation, undoubtedly connected with *liberi*, would also be grouped with *libet* Libitina is the goddess of the dead, who would have nothing in common with Lubentina and Lubentia (attribute of Venus), which belongs to *libet*, the name is as yet unexplained (Compare the later comments in this work) *Libare*=to pour (to sacrifice ?) and is supposed to have nothing to do with *liber* The etymology of *libido* shows not only the central setting of the idea, but also the connection with the German *Liebe* (love) We are obliged to say under these circumstances that not only the idea, but also the word *libido* is well chosen for the subject under discussion

[30] A corrected view on the conservation of energy in the light of the theory of cognition might offer the comment that this picture is the projection of an endopsychic perception of the equivalent transformations of the libido

CHAPTER II

[1] Freud "Three Contributions to the Sexual Theory," p 29 Translation by Brill "In a non-sexual 'impulse' originating from impulses of motor sources we can distinguish a contribution from a stimulus receiving organ, such as the skin, mucous membrane, and sensory organs This we shall here designate as an erogenous zone, it is that organ the stimulus of which bestows on the impulse the sexual character."

[2] Freud Ibid., p 14 "One definite kind of contiguity, consisting of mutual approximation of the mucous membranes of the lips in the form of a kiss, has among the most civilized nations received a sexual value though the parts of the body concerned do not belong to the sexual apparatus but form the entrance to the digestive tract."

[3] See Freud. Ibid

[4] An old view which Möbius endeavoured to bring again to its own Among the newcomers it is Fouillée Wundt, Beneke Spencer Ribot and others, who grant the psychologic primate to the impulse system

[5] Freud Ibid p 25 "I must repeat that these psychoneuroses, as far as my experience goes, are based on sexual motive powers I do not mean that the energy of the sexual impulse contributes to the forces supporting the morbid manifestations (symptoms), but I wish distinctly to maintain that this supplies the only constant and the most important source of energy in the neurosis, so that the sexual life of such persons manifests itself either exclusively, preponderately, or partially in these symptoms"

[6] That scholasticism is still firmly rooted in mankind is only too easily proven, and an illustration of this is the fact that not the least of the reproaches directed against Freud, is that he has changed certain of his earlier conceptions Woe to those who compel mankind to learn anew! "Les savants ne sont pas curieux"

[7] *Jahrbuck*, Vol III, p 65

[8] Schreber's case is not a pure paranoia in the modern sense

[9] Also in "Der Inhalt der Psychose," 1908

[10] Compare Jung "The Psychology of Dementia Praecox," p 114

[11] For example, in a frigid woman who as a result of a specific sexual repression does not succeed in bringing the libido sexualis to the husband, the parent imago is present and she produces symptoms which belong to that environment

[12] Similar transgression of the sexual sphere might also occur in hysterical psychoses, that indeed is included with the definition of the psychosis and means nothing but a general disturbance of adaptation

[13] "Die psychosexuellen Differenzen der Hysterie und der Dementia praecox," *Zentralblatt fur Nervenheilkunde und Psychiatrie*, 1908

[14] "Introjektion und Übertragung," *Jahrbuch*, Vol I, p 422.

[15] See Avenarius "Menschliche Weltbegriffe," p 25

[16] "Welt als Wille und Vorstellung," Vol I, p. 54

[17] "Theogonie"

[18] Compare Roscher "Lexicon," p 2248

[19] Drews "Plotinus," Jena 1907, p 127

[20] Ibid, p. 132

[21] Ibid, p 135

[22] Plotinus, "Enneades," II, 5, 3

[23] Plotinus "Enneades," IV, 8, 3

[24] "Enneades," III, 5, 9

[25] Ibid, p 141

[26] Naturally this idea does not mean that the function of reality owes its existence to the differentiation in procreative instincts exclusively I am aware of the undetermined great part played by the function of nutrition

[27] Malthusianism is the artificial setting forth of the natural tendency

[28] For instance, in the form of procreation as in general of the will.

[29] Freud in his work on paranoia has allowed himself to be carried over the boundaries of his original conception of libido by the facts of this illness He there uses libido even for the function of reality, which cannot be reconciled with the standpoint of the " Three Contributions "

[30] Bleuler arrives at this conclusion from the ground of other considerations, which I cannot always accept See Bleuler, " Dementia Praecox," in Aschaffenburg's " Handbuch der Psychiatrie "

[31] See Jung: " Kritik über E Bleuler Zur Theorie des schizophrenen Nagativismus " *Jahrbuch,* Vol III, p 469.

[32] Spielrein " Über den psychologischen Inhalt eines Falles von Schizophrenie " *Jahrbuch,* Vol III, p 329

[33] His researches are in my possession and their publication is in preparation

[34] Honegger made use of this example in his lecture at the private psychoanalytic congress in Nurnberg, 1910

[35] Spielrein Ibid , pp 338, 353, 387. For soma as the " effusion of the seed," see what follows

[36] Compare Berthelot. " Les Alchémistes Grecs," and Spielrein Ibid, p 353.

[37] I cannot refrain from observing that this vision reveals the original meaning of alchemy A primitive magic power for generation, that is to say, a means by which children could be produced without the mother

[38] Spielrein Ibid , pp 338, 345

[39] I must mention here those Indians who create the first people from the union of a sword hilt and a shuttle.

[40] Obid , p 399

CHAPTER III

[1] Naturally a precursor of onanism.

[2] This true catatonic pendulum movement of the head, I saw arise in the case of a catatonic patient, from the coitus movements gradually shifted upwards This Freud has described long ago as a shifting from below to above

[3] She put the small fragments which fell out into her mouth and ate them

[4] " Dreams and Myths " Vienna 1909. Translated by Wm A White, M D.

[5] A. Kuhn " Mythologische Studien," Vol I " Die Herabkunft des Feuers und des Gottertrankes " Gütersloh 1886 A very readable résumé of the contents is to be found in Steinthal " Die ursprungliche Form der Sage von Prometheus," *Zeitschrift für Völkerpsychologie und Sprachwissenschaft,* Vol 1862 , also in Abraham Ibid.

[6] Also mathânmi and mâthayati The root *manth* or *math* has a special significance

[7] *Zeitschrift für vergleichende Sprachforschung,* Vol II, p 395, and Vol. IV, p 124

[8] Bapp in Roscher's " Lexicon," Sp 3034

[9] *Bhrgu* = φλεγυ, a recognized connection of sound See Roscher Sp. 3034, 54

[10] For the eagle as a fire token among the Indians, see Roscher · Sp 3034, 60.

[11] The stem *manth* according to Kuhn becomes in German *mangeln, rollen* (referring to washing). Manthara is the butter paddle. When the gods generated the amrta (drink of immortality) by twirling the ocean around, they used the mountain Mandara as the paddle (see Kuhn: Ibid., p. 17). Steinthal calls attention to the Latin expression in poetical speech, *mentula* = male member, in which *ment* (*manth*) was used. I add here also, *mentula* is to be taken as diminutive for *menta* or *mentha* (μίνθα), *Minze*. In antiquity the *Minze* was called "Crown of Aphrodite" (Dioscorides, II, 154). Apuleius called it "mentha venerea"; it was an aphrodisiac. (The opposite meaning is found in Hippocrates: Si quis eam saepe comedat, ejus genitale semen ita colliquescit, ut effluat, et arrigere prohibet et corpus imbecillum reddit, and according to Dioscorides, Minze is a means of preventing conception. (See Aigremont: "Volkserotik und Pflanzenwelt," Vol. I, p. 127.) But the ancients also said of Menta: "Menta autem appellata quod suo odore mentem feriat—mentae ipsius odor animum excitat." This leads us to the root *ment*—in Latin *mens*; English, mind—with which the parallel development to *pramantha*, Προμηθεύς, would be completed. Still to be added is that an especially strong chin is called *mento* (*mentum*). A special development of the chin is given, as we know, to the priapic figure of Pulcinello, also the pointed beard (and ears) of the satyrs and the other priapic demons, just as in general all the protruding parts of the body can be given a masculine significance and all the receding parts or depressions a feminine significance. This applies also to all other animate or inanimate objects. See Maeder: *Psycho-Neurol. Wochenschr.*, X Jahrgang. However, this whole connection is more than a little uncertain.

[12] Abraham observes that in Hebrew the significance of the words for man and woman is related to the symbolism.

[13] "What is called the guhya (pudendum) means the yoni (the birthplace) of the God; the fire, which was born there, is called 'beneficent.'" ("Katyayanas Karmapradipa," I, 7; translated by Kuhn: "Herabkunft des Feuers," p. 67.) The etymological connection between *bohren*—*geboren* is possible. The Germanic *boron* (to bore) is primarily related to the Latin *forare* and the Greek φαρόω = to plow. Possibly it is an Indo-Germanic root *bher* with the meaning to bear; Sanscrit *bhar-*; Greek φερ-; Latin *fer-*; from this Old High German *beran*, English to bear, Latin *fero* and *fertilis*, *fordus* (pregnant); Greek φορός. Walde ("Latin Etmy.," s. Ferio) traces *forare* to the root *bher*. Compare with this the phallic symbolism of the plough, which we meet later on.

[14] Weber: "Indische Studien," I, 197; quoted by Kuhn: Ibid., p. 71.

[15] "Rigveda" III, 29—1 to 3.

[16] Or mankind in general. Viçpatni is the feminine wood, viçpati, an attribute of Agni, the masculine. In the instruments of fire lies the origin of the human race, from the same perverse logic as in the before mentioned shuttle and sword hilt. Coitus as the means of origin of the human race must be denied, from the motive, to be more fully discussed later, of a primitive resistance against sexuality.

[17] Wood as the symbol of the mother is well known from the dream investigation of the present time. See Freud: "Dream Interpretation." Stekel ("Sprache des Traumes," p. 128) explains it as the symbol of the woman. Wood is also a German vulgar term for the breast. ("Wood before the house.") The Christian wood symbolism needs a chapter by itself. The son of Ilâ: Ilâ is the daughter of Manus, the one and only, who with the help of his fish has overcome the deluge, and then with his daughter again procreated the human race.

[18] See Hirt: "Etymologie der neuhochdeutschen Sprache," p. 348.

[19] The capitular of Charlemagne of 942 forbade "those sacrilegious fires which are called Niedfyr." See Grimm: "Mythologie," 4th edition, p. 502. Here there are to be found descriptions of similar fire ceremonies.

[20] Kuhn Ibid, p 43

[21] Preuss "Globus," LXXXVI, 1905, S 358

[22] Compare with this Friedrich Schultze "Psychologie der Naturvolker," p 161

[23] This primitive play leads to the phallic symbolism of the plough. 'Αροῦν means to plough and possesses in addition the poetic meaning of impregnate The Latin *arare* means merely to plough, but the phrase "fundum alienum arare" means "to pluck cherries in a neighbor's garden" A striking representation of the phallic plough is found on a vase in the archeological museum in Florence It portrays a row of six naked ithyphallic men who carry a plough represented phallically (Dieterich "Mutter Erde," p 107) The "carrus navalis" of our spring festival (carnival) was at times during the Middle Ages a plough (Hahn "Demeter und Baubo," quoted by Dieterich Ibid, p 109). Dr Abegg of Zurich called my attention to the clever work of R Meringer ("Worter und Sachen Indogermanische Forschungen," 16, 179/84, 1904) We are made acquainted there with a very far-reaching amalgamation of the libido symbols with the external materials and external activities, which support our previous considerations to an extraordinary degree. Meringer's assumption proceeds from the two Indo-Germanic roots, *uen* and *ueneli* Indo-Germanic **uen Holz*, ai ist *van, vana* Agni is *garbhas vanam*, "fruit of the womb of the woods."

Indo-Germanic **ueneli* signifies "he ploughs" by that is meant the penetration of the ground by means of a sharpened piece of wood and the throwing up of the earth resulting from it This verb itself is not verified because this very primitive working of the ground was given up at an early time When a better treatment of the fields was learned, the primitive designation for the ploughed field was given to the pasture, therefore Gothic *vinja, νομή*, Old Icelandic *vin*, pasture, meadow Perhaps also the Icelandic *Vanen*, as Gods of agriculture, came from that

From *ackern* (to plough) sprang *coïre* (the connection might have been the other way), also Indo-Germanic **uenos* (enjoyment of love), Latin *venus*. Compare with this the root *uen*=wood *Coire*=passionately to strive, compare Old High German *vinnan*, to rave or to storm, also the Gothic *vens*, ἐλπίς = hope, Old High German *wân*=expectation, hope, Sanscrit *van*, to desire or need, further, *Wonne* (delight, ecstacy), Old Icelandic *vinr* (beloved, friend). From the meaning *ackern* (to plough) arises *wohnen* (to live) This transition has been completed only in the German From *wohnen—gewöhnen, gewohnt sein* (to be accustomed), Old Icelandic *vanr*=*gewohnt* (to be accustomed); from *ackern* further—*sich muhen, plagen* (to take much trouble, wearing work), Old Icelandic *vinna*, to work Old High German *winnan* (to toil hard, to overwork), Gothic *vinnan*, πάσχειν, *vunns*, πάθημα From *ackern* comes, on the other hand, *gewinnen erlangen* (to win, to attain), Old High German *giwinnan*, but also *verletzen* (to injure) · Gothic *vunds* (*wund*), wound *Wund* in the beginning, the most primal sense, was therefore the ground torn up by the wooden implement From *verletzen* (to injure) come *schalgen* (to strike), *besiegen* (to conquer) Old High German *winna* (strife), Old Saxon *winnan* (to battle)

[24] The old custom of making the "bridal bed" upon the field, which was for the purpose of rendering the field fertile, contains the primitive thought in the most elementary form, by that the analogy was expressed in the clearest manner Just as I impregnate the woman, so do I impregnate the earth The symbol leads the sexual libido over to the cultivation of the earth and to its fruitfulness Compare with that Mannhardt "Wald- und Feldkulte," where there are abundant illustrations

[25] Spielrein's patient (*Jahrbuch*, III, p 371) associates fire and generation in an unmistakable manner She says as follows concerning it · "One

needs iron for the purpose of piercing the earth and for the purpose of creating fire" This is to be found in the Mithra liturgy as well In the invocation to the fire god, it is said ὁ συνδήσας πνεύματι τὰ πύρινα κλεῖθρα τοῦ οὐρανοῦ (Thou who hast closed up the fiery locks of heaven, with the breath of the spirit,—open to me) "With iron one can create cold people from the stone" The boring into the earth has for her the meaning of fructification or birth She says "With the glowing iron one can pierce through mountains The iron becomes glowing when one pushes it into a stone"

Compare with this the etymology of *bohren* and *gebaren* (see above). In the "Bluebird" of Maeterlinck the two children who seek the bluebird in the land of the unborn children, find a boy who bores into his nose It is said of him he will discover a new fire, so as to warm the earth again, when it will have grown cold

[26] Compare with this the interesting proofs in Bucher: "Arbeit und Rhythmus," Leipzig 1899

[27] Amusement is undoubtedly coupled with many rites, but by no means with all There are some very unpleasant things

[28] The Upanishads belong to the Brâhmana, to the theology of the Vedic writings, and comprise the theosophical speculative part of the Vedic teachings The Vedic writings and collections are in part of very uncertain age and may reach back to a very distant past because for a long period they were handed down only orally

[29] The primal and omniscient being the idea of whom, translated into psychology, is comprehended in the conception of libido

[30] Âtman is also considered as originally a bi-sexual being—corresponding to the libido theory The world sprang from desire Compare *Brihadâranyaka Upanishad*, I, 4, 1 (Deussen)

"(1) In the beginning this world was Âtman alone—he looked around Then he saw nothing but himself

"(2) Then he was frightened therefore, one is afraid, when one is alone Then he thought Wherefore should I be afraid, since there is nothing beside myself?

"(3) But also he had no joy, therefore one has no joy when one is alone Then he longed for a companion"

After this there follows the description of his division quoted above Plato's conception of the world-soul approaches very near to the Hindoo idea "The soul in no wise needed eyes, because near it there was nothing visible Nothing was separate from it, nothing approached it, because outside of it there was nothing" ("Timaios")

[31] Compare with this Freud's "Three Contributions to the Sexual Theory"

[32] What seems an apparently close parallel to the position of the hand in the Upanishad text I observed in a little child The child held one hand before his mouth and rubbed it with the other, a movement which may be compared to that of the violinist It was an early infantile habit which persisted for a long time afterwards

[33] Compare Freud "Bemerkungen uber einen Fall von Zwangsneurose" 1912 *Jahrbuch*, Vol I, p 357

[34] As shown above, in the child the libido progresses from the mouth zone into the sexual zone

[35] Compare what has been said above about Dactyli Abundant examples are found in Aigremont: "Fuss- und Schuhsymbolik"

[36] When, in the enormously increased sexual resistance of the present day, women emphasize the secondary signs of sex and their erotic charm by specially designed clothing, that is a phenomenon which belongs in the same general scheme for the heightening of allurement

[37] It is well known that the orifice of the ear has also a sexual value In a hymn to the Virgin it is called "quae per aurem concepisti" Rabelais' Gargantua was born through his mother's ear Bastian ("Beiträge z vergl Psychologie," p 238) mentions the following passage from an old work, "There is not to be found in this entire kingdom, even among the very smallest girls, a maiden, because even in her tender youth she puts a special medicine into her genitals, also in the orifice of her ears, she stretches these and holds them open continuously."—Also the Mongolian Buddha was born from the ear of his mother

[38] The driving motive for the breaking up of the ring might be sought as I have already intimated in passing, in the fact that the secondary sexual activity (*the transformed coitus) never is or would be adapted to bring about* that natural satiety, as in the activity in its real place With this first step towards transformation, the first step towards the characteristic dissatisfaction was also taken, which later drove man from discovery to discovery without allowing him ever to attain satiety Thus it looks from the biological standpoint, which however is not the only one possible

[39] Translated by Mead and Chattopâdhyaya Sec. 1, Pt II

[40] In a song of the Rigveda it is said that the hymns and sacrificial speeches as well as all creation in general, have proceeded from the "entirely fire consumed" Purusha (primitive man-creator of the world)

[41] Compare Brugsch "Religion und Myth. d alt Aegypter," p. 255 f, and the Egyptian dictionary.

[42] The German word "Schwan" belongs here, therefore it sings when dying It is the sun. The metaphor in Heine supplements this very beautifully

> "Es singt der Schwan im Weiher
> Und rudert auf und ab,
> Und immer leiser singend,
> Taucht er ins Flutengrab"

Hauptmann's "Sunken Bell" is a sun myth in which bell=sun=life=libido

[43] Loosely connected with ag-ilis See Max Muller. "Vorl über den Ursprung und die Entwicklung der Religion," p 237

[44] An Eranian name of fire is *Nairyôçagha*=masculine word The Hindoo *Narâçamsa* means wish of men (Spiegel: "Erân Altertumskunde," II 49) Fire has the significance of Logos (compare Ch 7, "Siegfried") Of *Agni* (fire), Max Muller, in his introduction to "The Science of Comparative Religions," says "It was a conception familiar to India to consider the fire upon the altar as being at the same time subject and object The fire burned the sacrifice and was thereby similar to the priest, the fire carried the sacrifice to the gods, and was thereby an intercessor between men and the gods fire itself, however, represented also something divine, a god, and when honor was to be shown to this god, then fire was as much the subject as the object of the sacrifice Hence the first conception, that Agni sacrificed itself, i e. that it produced for itself its own sacrifice, and next that it brings itself to the sacrifice" The contact of this line of thought with the Christian symbol is plainly apparent Krishna utters the same thought in the "Bhagavad-Gîtâ," b. IV (translated by Arnold, London, 1910)

> "All's then God!
> The sacrifice is Brahm, the ghee and grain
> Are Brahm, the fire is Brahm, the flesh it eats
> Is Brahm, and unto Brahm attaineth he
> Who, in such office, meditates on Brahm"

The wise Diotima sees behind this symbol of fire (in Plato's symposium, c 23) She teaches Socrates that Eros is "the intermediate being between

mortals and immortals, a great Demon, dear Socrates, for everything demoniac is just the intermediate link between God and man." Eros has the task "of being interpreter and messenger from men to the gods, and from the gods to men, from the former for their prayers and sacrifices, from the latter for their commands and for their compensations for the sacrifices, and thus filling up the gap between both, so that through his mediation the whole is bound together with itself" Eros is a son of Penia (poverty, need) generated by Poros intoxicated with nectar The meaning of Poros is dark, πόρος means way and hole opening Zielinski "Arch f Rel Wissensch," IX, 43 ff, places him with Phoroneus, identical with the fire bringer, who is held in doubt, others identify him with primal chaos, whereas others read arbitrarily Κόρος and Μόρος Under these circumstances, the question arises whether there may not be sought behind it a relatively simple sexual symbolism Eros would be then simply the son of Need and of the female genitals, for this door is the beginning and birthplace of fire. Diotima gives an excellent description of Eros "He is manly, daring, persevering, a strong hunter (archer, compare below) and an incessant intriguer, who is constantly striving after wisdom,—a powerful sorcerer, poison mixer and sophist, and he is respected neither as an immortal nor as a mortal, but on the same day he first blooms and blossoms, when he has attained the fulness of the striving, then dies in it but always awakens again to life because of the nature of his father (rebirth!), attainment, however, always tears him down again" For this characterization, compare Chs V, VI and VII of this work

[45] Compare Riklin "Wish Fulfilment and Symbolism in Fairy Tales," translated by Wm White, M D, where a child is produced by the parents placing a little turnip in the oven The motive of the furnace where the child is hatched is also found again in the type of the whale dragon myth It is there a regularly recurring motive because the belly of the dragon is very hot, so that as the result of the heat the hero loses his hair that is to say, he loses the characteristic covering of hair of the adult and becomes a child (Naturally the hair is related to the sun's rays, which are extinguished in the setting of the sun) Abundant examples of this motive are in Frobenius "Das Zeitalter des Sonnengottes," Vol. I, Berlin 1904

[46] This aspect of Agni is similar to Dionysus, who bears a remarkable parallel to both the Christian and the Hindo mythology

[47] "Now everything in the world which is damp, he created from sperma, but this is the soma" *Brihadâranyaka-Upanishad*, 1-4

[48] The question is whether this significance was a secondary development Kuhn seems to assume this He says ("Herabkunft des Feuers" p. 18). "However, together with the meaning of the root *manth* already evolved, there has also developed in the Vedas the conception of 'tearing off' due naturally to the mode of procedure"

[49] Examples in Frobenius · "Das Zeitalter des Sonnengottes"

[50] See in this connection Stekel: "Die sexuelle Wurzel der Kleptomanie," *Zeitschrift für Sexualwissenschaft*, 1908

[51] Even in the Roman Catholic church at various places the custom prevailed for the priest to produce once a year the ceremonial fire.

[52] I must remark that the designation of onanism as a "great discovery" is not merely a play with words on my part I owe it to two young patients who pretended that they were in possession of a terrible secret, that they had discovered something horrible, which no one had ever known before, because had it been known great misery would have overtaken mankind. Their discovery was onanism

[53] One must in fairness, however, consider that the demands of life, rendered still more severe by our moral code, are so heavy that it simply is impossible for many people to attain that goal which can be begrudged to no one, namely

the possibility of love Under the cruel compulsion of domestication, what is left but onanism, for those people possessed of an active sexuality? It is well known that the most useful and best men owe their ability to a powerful libido This energetic libido longs for something more than merely a Christian love for the neighbour

[54] I am fully conscious that onanism is only an intermediate phenomenon There always remains the problem of the original division of the libido

[55] In connection with my terminology mentioned in the previous chapter, I give the name of autoerotic to this stage following the incestuous love Here I emphasize the erotic as a regressive phenomenon, the libido blocked by the incest barrier regressively takes possession of an older way of functioning anterior to the incestuous object of love This may be comprehended by Bleuler's terminology, Autismus, that is, the function of pure self-preservation, which is especially distinguished by the function of nutrition. However, the terminology "autismus" cannot very well be longer applied to the presexual material, because it is already used in reference to the mental state of dementia praecox where it has to include autoerotism plus introverted desexualized libido. Autismus designates first of all a pathological phenomenon of regressive character, the presexual material, however, of a normal functioning, the chrysalis stage.

CHAPTER IV

[1] Therefore that beautiful name of the sun-hero Gilgamesh Wehfrohmensch (pain-joy human being) See Jensen "Gilgamesh Epic"

[2] Compare here the interesting researches of H. Silberer 1912 *Jahrbuch*, Vol I, p 513

[3] See Bleuler *Psychiatr -neurol Wochenschrift*, XII Jahrgang, Nr 18 to 21

[4] Compare with this my explanations in *Jahrbuch*, Vol III, p 469

[5] Compare the exhortation by Krishna to the irresolute Arjuna in Bhagavad-Gitâ "But thou, be free of the pairs of opposites!" Bk. II, "The Song Celestial," Edwin Arnold

[6] "Pensées," LIV

[7] See the following chapter

[8] Compare John Muller "Über die phantastischen Gesichtserscheinungen," Coblenz 1826, and Jung "Occult Phenomena," in Collected Papers on Analytic Psychology

[9] Also the related doctrine of the Upanishad

[10] Bertschinger, "Illustrierte Halluzinationen," *Jahrbuch*, Vol III, p 69

[11] How very important is the coronation and sun identification, is shown not alone from countless old customs, but also from the corresponding ancient metaphors in the religious speech the Wisdom of Solomon v 17 "Therefore, they will receive a beautiful crown from the hand of the Lord" I Peter v 4. "Feed the flock of God and when the chief shepherd shall appear ye shall receive a crown of glory that fadeth not away"
In a church hymn of Allendorf it is said of the soul "The soul is liberated from all care and pain and in dying it has come to the *crown of joy*, she stands as bride and queen in the *glitter of eternal splendor*, at the side of the great king, etc" In a hymn by Laurentius Laurentii it is said (also of the soul) "The crown is entrusted to the brides because they conquer" In a song by Sacer we find the passage "Adorn my coffin with garlands just as a conqueror is adorned,—from those springs of heaven, my soul has attained the eternally green crown the true glory of victory, coming from the son

of God who has so cared for me." A quotation from the above mentioned song of Allendorf is added here, in which we have another complete expression of the primitive psychology of the sun identification of men, which we met in the Egyptian song of triumph of the ascending soul.

(Concerning the soul: continuation of the above passage.) "It [the soul] sees a clear countenance [sun], his [the sun's] joyful loving nature now restores it through and through; it is a *light in his light*. Now the *child can see the father*. He feels the gentle emotion of love. Now he can understand the word of Jesus: He himself, the father, has loved you. An unfathomable sea of benefits, an abyss of eternal waves of blessing is disclosed to the enlightened spirit; he beholds the countenance of God, and knows what signifies *the inheritor of God in light and the co-heir of Christ*.—The feeble body rests on the earth; it sleeps until Jesus awakens it. *Then will the dust become the sun*, which now is covered by the dark cavern. Then shall we come together with all the pious, who knows how soon, and will be for eternity with the Lord." I have emphasized the significant passages by italics; they speak for themselves, so that I need add nothing.

[12] In order to avoid misunderstanding I must add that this was absolutely unknown to the patient.

[13] The analysis of an eleven year old girl also confirms this. I gave a report of this in the I Congrès International de Pédologie, 1911, in Brussels.

[14] The identity of the divine hero with the mystic is not to be doubted. In a prayer written on papyrus to Hermes, it is said: σὺ γὰρ ἐγὼ καὶ ἐγὼ σύ τὸ σὸν ὄνομα ἐμὸν καὶ τὸ ἐμὸν σόν ἐγὼ γάρ εἰμι τὸ εἴδωλόν σου (For thou art I and I am thou, thy name is mine, and mine is thine; for I am thy image.) (Kenyon: Greek Papyrus, in the British Museum, 1893, p. 116. Pap. CXXII, 2. Cited by Dieterich: "Mithrasliturgie," p. 79.) The hero as image of the libido is strikingly illustrated in the head of Dionysus at Leiden (Roscher, I, Sp. 1128), where the hair rises like flame over the head. He is like a flame: "Thy saviour will be a flame." Firmicus Maternus ("De Errore Prof. Relig.," 19, p. 28) acquaints us with the fact that the god was saluted as bridegroom, and "young light." He transmits the corrupt Greek sentence δε νυνφε χαιρε νυνφε νεον φως, with which he contrasts the Christian conception: "Nullum apud te lumen est nec est aliquis qui sponsus mereatur audire: unum lumen est, unus est sponsus. Nominum horum gratiam Christus accepit." To-day Christ is still our hero and the bridegroom of the soul. These attributes will be confirmed in regard to Miss Miller's hero in what follows.

[15] The giving of a name is therefore of significance in the so called spiritual manifestations. See my paper, 1902, "Occult Phenomena," Collected Papers on Analytical Psychology.

[16] The ancients recognized this demon as συνοπαδός, the companion and follower.

[17] A parallel to these phantasies are the well-known interpretations of the Sella Petri of the pope.

[18] When Freud called attention through his analytic researches to the connection between excrements and gold, many ignorant persons found themselves obliged to ridicule in an airy manner this connection. The mythologists think differently about it. De Gubernatis says that excrement and gold are always associated together. Grimm tells us of the following magic charm: "If one wants money in his house the whole year one must eat lentils on New Year's Day." This notable connection is explained simply through the physiological fact of the indigestibility of lentils, which appear again in the form of coins. Thus one becomes a mint.

[19] A French father who naturally disagreed with me in regard to this interest in his child mentioned, nevertheless, that when the child speaks of cacao, he always adds "lit"; he means caca-au-lit.

[10] Freud *Jahrbuch*, Vol I, p. 1. Jung · *Jahrbuch*, Vol II, p 33 See third lecture delivered at Clark University, 1909

[11] I refer to the previous etymologic connection

[12] Compare Bleuler *Jahrbuch*, Vol III, p. 467.

[13] " Genius and Insanity "

[14] Here again is the connection with antiquity, the infantile past

[15] This fact is unknown to me It might be possible that in some way the name of the legendary man who invented the cuneiform characters has been preserved (as, for example, Sinlikiunnini as the poet of the Gilgamesh epic) But I have not succeeded in finding anything of that sort However, Ashshurbanaplu or Asurbanipal has left behind that marvellous cuneiform library, which was excavated in Kujundschik Perhaps " Asurubama " has something to do with this name Further there comes into consideration the name of Aholibamah, which we have met in Part I The word " Ahamarama " betrays equally some connections with Anah and Aholibamah, those daughters of Cain with the sinful passion for the sons of God This possibility hints at Chiwantopel as the longed-for son of God. (Did Byron think of the two sister whores, Ohola and Oholiba ? Ezeck xxiii · 4)

[16] The race does not part with its wandering sun-heroes Thus it was related of Cagliostro, that he once drove at the same time four white horses out of a city from all the city gates simultaneously (Helios !)

[17] Mysticism

[18] Agni, the fire, also hides himself at times in a cavern. Therefore he must be brought forth again by generation from the cavity of the female wood Compare Kuhn . " Herabk. des Feuers."

[19] We=Allah

[20] The " two-horned " According to the commentaries, this refers to Alexander the Great, who in the Arabian legends plays nearly the same rôle as the German Dietrich von Bern The " two-horned " refers to the strength of the sun-bull Alexander is often found upon coins with the horns of Jupiter Ammon It is a question of identification of the ruler around whom so many legends are clustered, with the sun of spring in the signs of the bull and the ram It is obvious that humanity had a great need of effacing the personal and human from their heroes, so as finally to make them, through a μετάστασις (eclipse), the equal of the sun, that is to say, completely into a libido-symbol. If we thought like Schopenhauer, then we would surely say, Libido-symbol But if we thought like Goethe, then we would say, Sun ; for we exist, because the sun sees us

[21] Vollers . " Chidher. Archiv fur Religionswissenschaft," p 235, Vol XII, 1909 This is the work which is my authority on the Koran commentaries.

[22] Here the ascension of Mithra and Christ are closely related. See Part I

[23] A parallel is found in the Mithra mysteries ! See below

[24] Parallel to this are the conversations of Mohammed with Elias, at which the sacramental bread was served In the New Testament the awkwardness is restricted to the proposal of Peter. The infantile character of such scenes is shown by similar features. thus by the gigantic stature of Elias in the Koran, and also the tales of the commentary, in which it is stated that Elias and Chidher met each year in Mecca, conversed and shaved each other's heads

[25] On the contrary, according to Matthew xvii · 11, John the Baptist is to be understood as Elias

[26] Compare the Kyffhäuser legend

[27] Vollers Ibid.

[38] Another account says that Alexander had been in India on the mountain of Adam with his "minister" Chidher.

[39] These mythological equations follow absolutely the rule of dreams, where the dreamer can be resolved into many analogous forms.

[40] "He must grow, but I must waste away."—John iii. 30.

[41] Cumont: "Textes et Monuments," p. 172.

[42] The parallel between Hercules and Mithra may be drawn even more closely. Like Hercules, Mithra is an excellent archer. Judging from certain monuments, not only the youthful Hercules appears to be threatened by a snake, but also Mithra as a youth. The meaning of the athla of Hercules (the work) is the same as the Mithraic mystery of the conquering and sacrifice of the bull.

[43] These three scenes are represented in a row on the Klagenfurt monument. Thus the dramatic connection of these must be surmised (Cumont: "Myst. des Mithras").

[44] Also the triple crown.

[45] The Christian sequence is John—Christ, Peter—Pope.

[46] The immortality of Moses is proven by the parallel situation with Elias in the transfiguration.

[47] See Frobenius: "Das Zeitalter des Sonnengottes."

[48] Therefore the fish is the symbol of the "Son of God", at the same time the fish is also the symbol of the approaching world cycle.

[49] Riklin: "Wish Fulfilment and Symbolism."

[50] Inman: "Ancient Pagan and Modern Christian Symbolism."

[51] The amniotic membrane (?)

[52] The Etrurian Tages, who sprang from the "freshly ploughed furrow," is also a teacher of wisdom. In the Litaolane myth of the Basutos, there is a description of how a monster devoured all men and left only one woman, who gave birth to a son, the hero, in a stable (instead of a cave; see the etymology of this myth). Before she had arranged a bed for the infant out of the straw, he was already grown and spoke "words of wisdom." The quick growth of the hero, a frequently recurring motive, appears to mean that the birth and apparent childhood of the hero are so extraordinary because his birth really means his rebirth, therefore he becomes very quickly adapted to his hero rôle. Compare below.

[53] Battle of Rê with the night serpent.

[54] Matthew iii. 11.

[55] "Das Gilgameshepos in der Weltliteratur," Vol. I, p. 50.

[56] The difference between this and the Mithra sacrifice seems to be extraordinarily significant. The Dadophores are harmless gods of light who do not participate in the sacrifice. The animal is lacking in the sacrifice of Christ. Therefore there are two criminals who suffer the same death. The scene is much more dramatic. The inner connection of the Dadophores to Mithra, of which I will speak later, allows us to assume the same relation of Christ to the criminals. The scene with Barabbas betrays that Christ is the god of the ending year, who is represented by one of the thieves, while the one of the coming year is free.

[57] For example, the following dedication is found on a monument: D. I. M. (Deo Invicto Mithrae) Cautopati. One discovers sometimes Deo Mithrae Caute or Deo Mithrae Cautopati in a similar alternation as Deo Invicto Mithrae—or sometimes Deo Invicto—or, merely, Invicto. It also appears that the Dadophores are fitted with knife and bow, the attributes of Mithra. From this it is to be concluded that the three figures represent

three different states of a single person Compare Cumont "Textes et Monuments," p. 208

[58] Cited by Cumont "Textes et Monuments," p. 208

[59] Ibid.

[60] Taurus and Scorpio are the equinoctial signs for the period from 4300 to 2150 B.C These signs, long since superseded, were retained even in the Christian era

[61] Under some circumstances, it is also sun and moon.

[62] In order to characterize the individual and the all-soul, the personal and the super-personal, Atman, a verse of the *Shvetâshvatara-Upanishad* (Deussen) makes use of the following comparison

> "Zwei schon beflugelte verbundne Freunde
> Umarmen einen und denselben Baum,
> Einer von ihnen speist die susse Beere,
> Der andre schaut, nicht essend, nur herab"

(Two closely allied friends, beautifully winged, embrace one and the same tree, One of them eats the sweet berries, the other not eating merely looks downwards)

[63] Among the elements composing man, in the Mithraic liturgy, fire is especially emphasized as the divine element, and described as τὸ εἰς ἐμὴν κρᾶσιν θεοδώρητον (The divine gift in my composition). Dietrich Ibid. p 58

[64] It is sufficient to point to the loving interest which mankind and also the God of the Old Testament has for the nature of the penis, and how much depends upon it

[65] The testicles easily count as twins Therefore in vulgar speech the testicles are called the Siamese twins ("Anthropophyteia," VII, p. 20. Quoted by Stekel "Sprache des Traumes," p 169)

[66] "Recherches sur le culte, etc., de Vénus," Paris, 1837 Quoted by Inman. "Ancient Pagan and Modern Christian Symbolism," New York, p 4

[67] The androgynous element is not to be undervalued in the faces of Adonis, Christ, Dionysus and Mithra, and hints at the bisexuality of the libido The smooth-shaven face and the feminine clothing of the Catholic priest contain a very old female constituent from the Attis-Cybele cult

[68] Stekel ("Sprache des Traumes") has again and again noted the Trinity as a phallic sumbol For example, see p. 27.

[69] Sun's rays=Phalli

[70] In a Bakairi myth a woman appears, who has sprung from a corn mortar In a Zulu myth it is said A woman is to catch a drop of blood in a vessel, then close the vessel, put it aside for eight months and open it in the ninth month She *follows the advice, opens the vessel in the ninth month*, and finds a child in it (Frobenius "Das Zeitalter des Sonnengottes" [The Age of the Sun-God], 1, p 237)

[71] Inman. Ibid, p 10, Plate IX

[72] Roscher "Lexicon," Sp 2733/4. *See section, Men.*

[73] A well-known sun animal, frequent as a phallic symbol.

[74] Like Mithra and the Dadophores

[75] The castration in the service of the mother explains this quotation in a very significant manner Exod iv 25 "Then Zipporah took a sharp stone, and cut off her son's foreskin and cast it at his feet and said, Surely, a bloody husband art thou to me" This passage shows what circumcision means

[76] Gilgamesh, Dionysus, Hercules, Christ, Mithra, and so on.

[77] Compare with this, Graf: "R. Wagner im fliegenden Holländer." Schriften zur angewandten Seelenkunde.

[78] I have pointed out above, in reference to the Zosimos vision, that the altar meant the uterus, corresponding to the baptismal font.

CHAPTER V

[1] Freud: "Dream Interpretation."

[2] I am indebted to Dr. Abegg in Zurich for the knowledge of Indra and Urvarâ, Domaldi and Rama.

[3] Medieval Christianity also considered the Trinity as dwelling in the womb of the holy Virgin.

[4] "Symbolism," Plate VII.

[5] Another form of the same motive is the Persian idea of the tree of life, which stands in the lake of rain, Vourukasha. The seeds of this tree were mixed with water and by that the fertility of the earth was maintained. "Vendîdâd," 5, 57, says: "The waters flow ... to the lake Vourukasha, down to the tree Hvâpa; there my trees of many kinds all grow. I cause these waters to rain down as food for the pure man, as fodder for the well-born cow." (Impregnation, in terms of the pre-sexual stage.) "Another tree of life is the white Haoma, which grows in the spring Ardvîçûra, the water of life." Spiegel: "Erân. Altertumskunde," I, 465, 467.

[6] Excellent examples of this are given in the work of Rank, "The Myth of the Birth of the Hero," translated by Wm. White.

[7] Shadows probably mean the soul, the nature of which is the same as libido. Compare with this Part I.

[8] But I must mention that Nork ("Realwörterbuch," sub Theben und Schiff) pleads that Thebes is the "ship city"; his arguments are much attacked. From among his arguments I emphasize a quotation from Diodorus (I, 57), according to which Sesostris (whom Nork associates with Xisuthros) had consecrated to the highest god in Thebes a vessel 280 els long. In the dialogue of Lucius (Apuleius: "Metam.," lib. II, 28), the night journey in the sea was used as an erotic figure of speech: "Hac enim sitarchia navigium Veneris indiget sola, ut in nocte pervigili et oleo lucerna et vino calix abundet." (For the ship of Venus needs this provision in order that during the night the lamp may abound with oil and the goblet with wine.) The union of the coitus motive with the motive of pregnancy is to be found in the "night journey on the sea" of Osiris, who in his mother's womb copulated with his sister.

[9] Very illuminating psychologically is the method and the manner in which Jesus treats his mother, when he harshly repels her. Just as strong and intense as this, has the longing for her imago grown in his unconscious. It is surely not an accident that the name Mary accompanies him through life. Compare the utterance of Matthew x: 35: "I have come to set a man at variance with his father, a daughter with her mother. He who loves father and mother more than me is not worthy of me." This directly hostile purpose, which calls to mind the legendary rôle of Bertran de Born, is directed against the incestuous bond and compels man to transfer his libido to the Saviour, who, dying, returning into his mother and rising again, is the hero Christ.

[10] Genitals.

[11] The horns of the dragon have the following attributes: "They will prey upon woman's flesh and they will burn with fire." The horn, a phallic emblem, is in the unicorn the symbol of the Holy Ghost (Logos). The unicorn

is hunted by the archangel Gabriel, and driven into the lap of the Virgin, by which was understood the immaculate conception But the horns are also sun's rays, therefore the sun-gods are often horned The sun phallus is the prototype of the horn (sun wheel and phallus wheel) therefore the horn is the symbol of power Here the horns "burn with fire" and prey upon the flesh, one recognizes in this a representation of the pains of hell where souls were burnt by the fire of the libido (unsatisfied longing) The harlot is "consumed" or burned by unsatisfied longing (libido) Prometheus suffers a similar fate, when the eagle, sun-bird (libido), tears his intestines one might also say, that he was pierced by the "horn" I refer to the phallic meaning of the spear

[12] *In the Babylonian underworld, for example. The souls have a feathery coat like birds. See the Gilgamesh epic*

[13] *In a fourteenth-century Gospel at Bruges there is a miniature where* the "woman" lovely as the mother of God stands with half her body in a dragon.

[14] τὸ ἀρνίον, little ram, diminutive of the obsolete ἀρήν = ram (In Theophrastus it occurs with the meaning of "young scion") The related word ἄρνις designates a festival annually in honor of Linos, in which the λίνος, the lament called Linos, was sung as a lamentation for Linos, the new-born son of Psamathe and Apollo, torn to pieces by dogs The mother had exposed her child out of fear of her father Krotopos But for revenge Apollo sent a dragon, Poine, into Krotopos' land The oracle of Delphi commanded a yearly lament by women and maidens for the dead Linos. A part of the honor was given to Psamathe The Linos lament is, as Herodotus shows (II, 79), identical with the Phœnician, Cyprian and Egyptian custom of the Adonis-(Tammuz) lament As Herodotus observes, Linos is called Maneros in Egypt Brugsch points out that Maneros comes from the Egyptian cry of lamentation, *maa-n-chru* "come to the call" Poine is characterized by her tearing the children from the womb of all mothers. This ensemble of motives is found again in the Apocalypse, xii 1-5, where it treats of the woman, whose child was threatened by a dragon but was snatched away into the heavens The child-murder of Herod is an anthropomorphism of this "primitive" idea The lamb means the son. (See Brugsch. "Die Adonisklage und das Linoslied," Berlin 1852) Dieterich (Abraxas. "Studien zur Religionsgeschichte des späteren Altertums," 1891) refers for an explanation of this passage to the myth of Apollo and Python, which he reproduces as follows "To Python, the son of earth, the great dragon, it was prophesied that the son of Leto would kill him, Leto was pregnant by Zeus · but Hera brought it about that she *could give birth only there where the sun did not shine.* When Python saw that Leto was pregnant, he began to pursue her in order to kill her, but Boreas brought Leto to Poseidon The latter brought her to Ortygia and covered the island with the waves of the sea. When Python did not find Leto, he returned to Parnassus Leto brought forth upon the island thrown up by Poseidon The fourth day after the birth, Apollo took revenge and killed the Python The birth upon the hidden island belongs to the motive of the "night journey on the sea" The typical character of the "island phantasy" has for the first time been correctly perceived by Riklin (1912 *Jahrbuch*, Vol II, p 246) A beautiful parallel for this is to be found, together with the necessary incestuous phantasy material, in H de Vere Stacpool "The Blue Lagoon" A parallel to "Paul and Virginia."

[15] Revelation xxi 2 "And the holy city, the new Jerusalem, I saw coming down from the *heaven of God, prepared as a bride adorned for her bridegroom*"

[16] The legend of Saktideva, in Somadeva Bhatta, relates that the hero, after he had escaped from being devoured by a huge fish (terrible mother), finally sees the golden city and marries his beloved princess (Frobenius, p 175).

[17] In the Apocryphal acts of St Thomas (2nd century) the church is taken to be the virgin mother spouse of Christ In an invocation of the apostle it is said:

> Come, holy name of Christ, thou who art above all names,
> Come, power of the highest and greatest mercy,
> Come, dispenser of the greatest blessings,
> Come, gracious mother
> Come, economy of the masculine
> Come, woman, thou who disclosest the hidden mysteries . . .

In another invocation it is said:

> Come, greatest mercy,
> Come, spouse (literally community) of the male,
> Come, woman thou who knowest the hidden things
> And who revealest the unspeakable things, holy
> Dove, thou who bringest forth the twin nestling,
> Come, mysterious mother, etc

F. C. Conybeare "Die jungfräuliche Kirche und die jungfräuliche Mutter" *Archiv fur Religionswissenschaft*, IX, 77 The connection of the church with the mother is not to be doubted, also the conception of the mother as spouse The virgin is necessarily introduced to hide the incest idea The "community with the male" points to the motive of the continuous cohabitation The "twin nestlings" refer to the old legend that Jesus and Thomas were twins It plainly expresses the motive of the Dioscuri. Therefore, doubting Thomas had to place his finger in the wound at the side. Zinzendorf has correctly perceived the sexual significance of this symbol that hints at the androgynous nature of the primitive being (the libido). Compare the Persian legend of the twin trees Meschia and Meschiane, as well as the motive of the Dioscuri and the motive of cohabitation

[18] Compare Freud "Dream Interpretation." Also Abraham "Dreams and Myths," pp 22 f

[19] Isaiah xlviii: 1 "Hear ye this O house of Jacob, which are called by the name of Israel and are come forth out of the waters of Judah"

[20] Wirth "Aus orientalischen Chroniken"—The Greek "Materia" is ὕλη, which means wood and forest, it really means moist, from the Indo-Germanic root *su* in ὕω, "to make wet, to have it rain", ὑετός = rain; Iranian *suth* = sap, fruit, birth, Sanscrit *sura* = brandy, *sulus* = pregnancy; *süte, suyate* = to generate, *sutas* = son; *sûras* = soma; υἱός = son; (Sanscrit, *sunûs*, gothic, *sunus*).

[21] Κοίμημα means cohabitation, κοιμητήριον bedchamber, hence coemeterium = cemetery, enclosed fenced place

[22] Nork "Realworterbuch."

[23] In a myth of Celebes, a dove maiden who was caught in the manner of the swan maiden myth, was called Utahagi after a white hair which grew on its crown and in which there was magic strength Frobenius, p 307

[24] Referring to the phallic symbolism of the finger, see the remarks about the Dactyli, Part II, Chap I I mention at this place the following from a Bakairi myth: "Nimagakaniro devoured two finger bones, many of which were in the house, because Oka used them for his arrow heads and killed many Bakairi whose flesh he ate The woman became pregnant from the finger bone and only from this, not from Oka" (quoted by Frobenius, p 236).

[25] Further proof for this in Prellwitz "Griechische Etymologie"

[26] Siecke "Der Gott Rudra in Rigveda". *Archiv für Religionswissenschaft*, Vol I, p 237

[27] The fig tree is the phallic tree It is noteworthy that Dionysus planted a fig tree at the entrance to Hades, just as "Phalli" are placed on graves

The cyprus tree consecrated to Aphrodite grew to be entirely a token of death, because it was placed at the door of the house of death

[28] Therefore the tree at times is also a representation of the sun A Russian riddle related to me by Dr. Van Ophuijsen reads "What is the tree which stands in the middle of the village and is visible in every cottage ?" Answer · 'The sun and its light" A Norwegian riddle reads

> "A tree stands on the mountain of Billings,
> It bends over a lake,
> Its branches shine like gold ·
> You won't guess that to day
>
> In the evening the daughter of the sun collected the golden branches, which had been broken from the wonderful oak.
>
> Bitterly weeps the little sun
> In the apple orchard
> From the apple tree has fallen
> The golden apple,
> Do not weep, little sun,
> God will make another
> Of gold, of bronze, of silver"

The picking of the apple from the paradise tree may be compared with the fire theft, the drawing back of the libido from the mother (See the explanations which follow concerning the specific deed of the hero)

[29] The relation of the son to the mother was the psychologic basis of many religions In the Christian legend the relation of the son to the mother is extraordinarily clear Robertson ("Evangelical Myths") has hit upon the relation of Christ to the Marys, and he conjectures that this relation probably refers to an old myth "where a god of Palestine, perhaps of the name of Joshua, appears in the changing relation of lover and son towards a mythical Mary This is a natural process in the oldest theosophy and one which appears with variations in the myths of Mithra, Adonis, Attis, Osiris and Dionysus, all of whom were brought into relation (or combination) with mother goddesses and who appear either as a consort or a feminine eidolon in so far as the mothers and consorts were identified as occasion offered"

[30] Rank has pointed out a beautiful example of this in the myth of the swan maiden
"Die Lohengrinsage Schriften zur angewandten Seelenkunde"

[31] Muther ("Geschichte der Malerei," Vol II) says in the chapter "The First Spanish Classic" "Tieck once wrote : Sexuality is the great mystery of our being Sensuality is the first moving wheel in our machinery It stirs our being and makes it joyous and living Everything we dream of as beautiful and noble is included here. Sexuality and senuousness are the spirit of music, of painting and of all art All wishes of mankind rotate around this center like moths around a burning light The sense of beauty and the feeling for art are only other expressions of it They signify nothing more than the impulse of mankind towards expression I consider devoutness itself as a diverted channel of the sexual desire" Here it is openly declared that one should never forget when judging the ancient ecclesiastic art that the effort to efface the boundaries between earthly and divine love, to blend them into each other imperceptibly, has always been the guiding thought, the strongest factor in the propaganda of the Catholic church

[32] We will not discuss here the reasons for the strength of the phantasy But it does not seem difficult to me to imagine what sort of powers are hidden behind the above formula

[33] Lactantius says "When all know that it is customary for certain animals to conceive through wind and breath of air, why should any one consider it miraculous for a virgin to be impregnated by the spirit of God ?" Robertson, "Evang Myth.," p 21.

[34] Therefore the strong emphasis upon affiliation in the New Testament

[35] The mystic feelings of the nearness of God, the so-called personal inner experience.

[36] The sexual mawkishness is everywhere apparent in the Lamb symbolism and the spiritual love songs to Jesus, the bridegroom of the soul

[37] Usener "Der heilige Tychon" 1907.

[38] Compare W P Knight "Worship of Priapus."

[39] Or in the compensating organizations, which appear in the place of religion

[40] The condition was undoubtedly ideal for early times, where mankind was more infantile in general and it still is ideal for that part of humanity which is infantile, how large is that part!

[41] Compare Freud: *Jahrbuch*, Vol III, p 1

[42] Here it is not to be forgotten we are moving entirely in the territory of psychology, which in no way is allied to transcendentalism either in positive or negative relation It is a question here of a scientific fulfilment of the standpoint of the theory of cognition, established by Kant, not merely for the theory, but, what is more important, for the practice One should avoid playing with the infantile image of the world, because all this tends only to separate man from his essential and highest ethical goal, moral autonomy The religious symbol should be retained after the inevitable obliteration of certain antiquated fragments, as postulate or as transcendent theory, and also as taught in precepts, but is to be filled with new meaning according to the demand of the culture of the present day But this theory must not become for the "adult" a positive creed and illusion, which causes reality to appear to him in a false light Just as man is a dual being having an intellectual and an animal nature, so does he appear to need two forms of reality, the reality of culture, that is, the symbolic transcendent theory, and the reality of nature, which corresponds to our conception of the "true reality" In the same measure that the true reality is merely a figurative interpretation of the appreciation of reality, the religious symbolic theory is merely a figurative interpretation of certain endopsychic apperceptions But one very essential difference is that a transcendental support, independent in duration and condition, is assured to the transubjective reality through the best conceivable guarantees, while for the psychologic phenomena a transcendental support of subjective limitation and weakness must be recognized as a result of compelling empirical data Therefore true reality is one that is relatively universally valid, the psychologic reality, on the contrary, is merely a functional phenomenon contained in an epoch of human civilization Thus does it appear to-day from the best informed empirical standpoint If, however, the psychologic were divested of its character of a biologic epiphenomenon in a manner neither known nor expected by me, and thereby was given the place of a physical entity, then the psychologic reality would be resolved into the true reality, or much more, it would be reversed, because then the psychologic would lay claim to a greater worth, for the ultimate theory, because of its directness

[43] "De Isid et Osir"

[44] Erman "Aegypten," p 360.

[45] Here I must recall that I give to the word "incest" more significance than properly belongs to the term Just as libido is the onward driving force, so incest is in some manner the backward urge into childhood For the child, it cannot be spoken of as incest Only for the adult who possesses a completely formed sexuality does the backward urge become incest because he is no longer a child but possesses a sexuality which cannot be permitted a regressive application

[46] Compare Frobenius "Das Zeitalter des Sonnengottes"

[47] Compare the "nightmare legends" in which the mare is a beautiful woman

[48] This recalls the phallic columns placed in the temples of Astarte In fact, according to one version, the wife of the king was named Astarte This symbol brings to mind the crosses, fittingly called ἐγκόλπια (pregnant crosses) which conceal a secret reliquary

[49] Spielrein (*Jahrbuch*, Vol III, p 358) points out numerous indications of the motive of dismemberment in a demented patient Fragments of the most varied things and materials were "cooked" or "burnt" "The ash can become man" The patient saw children dismembered in glass coffins In addition, the above-mentioned "washing," "cleaning," "cooking," and "burning" has, besides the coitus motive, also the pregnancy motive; the latter probably in a predominating measure

[50] Later offshoots of this primitive theory of the origin of children are contained in the doctrines of Karma, and the conception of the Mendelian theory of heredity is not far off One only has to realize that all apperceptions are subjectively conditioned

[51] Demeter assembled the limbs of the dismembered Dionysus and from them produced the god anew

[52] Compare Diodorus III, 62.

[53] Yet to be added is the fact that the cynocephalic Anubis as the restorer of the corpse of Osiris (also genius of the dog star) had a compensatory significance In this significance he appears upon many sarcophagi The dog is also a regular companion of the healing Asclepius The following quotation from Petronius best supports the Creuzer hypothesis ("Sat," c. 71) "Valde te rogo, ut secundum pedes statuae meae catellam pingas —ut mihi contingat tuo beneficio post mortem vivere" (I beseech you instantly to fasten beside the feet of my statue a dog, so that because of your beneficence I may attain to life after death) See Nork Ibid, about dog)
Moreover, the relation of the dog to the god-headed Hecate, the goddess of the underworld, hints at its being the symbol of rebirth She received as Canicula a sacrificial dog to keep away the pest Her close relation to Artemis as goddess of the moon permits her opposition to fertility to be glimpsed Hecate is also the first to bring to Demeter the news of her stolen child (the role of Anubis !) Also the goddess of birth Ilithyia received sacrifices of dogs, and Hecate herself is, on occasions, goddess of marriage and birth

[54] Frobenius (Ibid, p 393) observes that frequently the gods of fire (sun-heroes) lack a member He gives the following parallel "Just as the god wrenches out an arm from the ogre (giant), so does Odysseus pluck out the eye of the noble Polyphemus, whereupon the sun creeps up mysteriously into the sky Might the fire-making, twisting, and wrenching out of the arm be connected?" This question is by this clearly illumined if we assume, corresponding to the train of thought of the ancients, that the wrenching out of the arm is really a castration (The symbol of the robbery of the force of life) It is an act corresponding to the Attis castration because of the mother. From this renunciation, which is really a symbolic mother incest, arises the discovery of fire, as previously we have already suspected Moreover, mention must be made of the fact that to wrench out an arm, means first of all merely "overpowering," and on that account can happen to the hero as well as to his opponent. (Compare, for examples, Frobenius: Ibid, pp 112, 395)

[55] Compare especially the description of the cup of Thebes

[56] Professor Freud has expressed in a personal discussion the idea that a further determinate for the motive of the dissimilar brothers is to be found in the elementary observance towards birth and the after-birth It is an exotic custom to treat the placenta as a child !

[57] Brugsch: "Religion und Mythologie der alten Aegypter," p. 354.

[58] Ibid., p. 310.

[59] In the conception of Ātman there is a certain fluid quality in so far as he really can be identified with Purusha of the Rigveda: "Purusha covers all the places of the earth, flowing about it ten fingers high."

[60] Brugsch: Ibid., p. 112.

[61] In Thebes, where the chief god is Chnum, the latter represents the breath of the wind in his cosmic component, from which later on "the spirit of God floating over the waters" has developed, the primitive idea of the cosmic parents, who lie pressed together until the son separates them. (Compare the symbolism of Ātman above.)

[62] Brugsch: Ibid., p. 128.

[63] Servian song from Grimm's "Mythology," II, p. 544.

[64] Frobenius: Ibid.

[65] Compare the birth of the Germanic Aschanes, where rock, tree and water are present at the scene of birth. Chidher too was found sitting on the earth, the ground around covered with flowers.

[66] Most singularly even in this quotation, V. 288, the description is found of Sleep sitting high up in a pine tree: "There he sat surrounded by branches covered with thorny leaves, like the singing bird, who by night flutters through the mountains." It appears as if the motive belongs to a hieros gamos. Compare also the magic net with which Hephaestos enfolds Ares and Aphrodite "in flagranti" and kept them for the sport of the gods.

[67] The rite of enchaining the statues of Hercules and the Tyrian Melkarth is related to this also. The Cabiri too were wrapt in coverings. Creuzer, "Symbolik" II, 350.

[68] Fick: "Indogermanisches Worterbuch," I, p. 132.

[69] Compare the "resounding sun."

[70] The motive of the "striking rocks" belongs also to the motive of devouring (Frobenius: Ibid., p. 405). The hero in his ship must pass between two rocks which strike together. (Similar to the biting door, to the tree trunk which snaps together.) In the passage, generally the tail of the bird is pinched off (or the "poop" of the ship, etc.); the castration motive is once more clearly revealed here, for the castration takes the place of mother incest. The castration is a substitution for coitus. Scheffel employs this idea in his well-known poem: "A herring loved an oyster, etc." The poem ends with the oyster biting off the herring's head for a kiss. The doves which bring Zeus ambrosia have also to pass through the rocks which strike together. The "doves" bring the food of immortality to Zeus by means of incest (entrance into the mother) very similar to Freya's apples (breasts). Frobenius also mentions the rocks or caves which open only at a magic word and are very closely connected with the rocks which strike together. Most illuminating in this respect is a South African myth (Frobenius, p. 407): "One must call the rock by name and cry loudly: Rock Utunjambili, open, so that I may enter." But the rock answers when it will not open to the call: "The rock will not open to children, it will open to the swallows which fly in the air!" The remarkable thing is, that no human power can open the rock, only a formula has that power—or a bird. This wording merely says that the opening of the rock is an undertaking which cannot really be accomplished, but which one wishes to accomplish.

(In Middle High German, to wish is really "to have the power to create something extraordinary.") When a man dies then only the wish that he might live remains, an unfulfilled wish, a fluttering wish, wherefore souls are birds. The soul is wholly only libido, as is illustrated in many parts of this work: it is "to wish." Thus the helpful bird, who assists the hero

in the whale to come again into the light, who opens the rocks, is the wish for rebirth (For the bird as a wish, see the beautiful painting by Thoma, where the youth longingly stretches out his arms to the birds who pass over his head)

[71] Grimm "Mythology," I, p 474

[72] In Athens there was a *family of* Αἰγειρότομοι = hewn *from* poplars

[73] Hermann "Nordische Mythologie," p. 589

[74] Javanese tribes commonly set up their images of God in an artificial cavity of a tree This fits in with the "little hole" phantasy of Zinzendorf and his sect See Pfister "Frommigkeit des Grafen von Zinzendorf" In a Persian myth, the white Haoma is a divine tree, growing in the lake Vourukasha, the fish Khar-mâhi circles protectingly around it and defends it against the toad Ahriman It gives eternal life, children to woman, husbands to girls and horses to men In the Minokhired the tree is called "the preparer of the corpse" (Spiegel. "Eran Altertumskunde," II, 115).

[75] Ship of the sun, which accompanies the sun and the soul over the sea of death to the rising

[76] Brugsch · Ibid, p 177.

[77] Similarly Isaiah li 1 " . . look unto the rock whence ye are hewn, and to the hole of the pit whence ye are digged " Further proof is found in A von Lowis of Menar "Nordkaukasische Steingeburtssagen," *Archiv fur Religionswissenschaft*, XIII, p 509

[78] Grimm "Mythology," I, p 474

[79] "Das Kreuz Christi Rel -hist -kirchl -archaeol Untersuchungen," 1875

[80] The legend of Seth is found in Jubinal "Mystères inédits du XV siècle," Part II, p 16 Quoted from Zockler Ibid, p 241

[81] The guilt is as always, whenever possible, thrown upon the mother. The Germanic sacred trees are also under the law of an absolute taboo no leaf may be taken from them, and nothing may be picked from the ground upon which their shadows fall

[82] According to the German legend (Grimm Vol. II, p 809), the redeeming hero will be born when the tree, which now grows as a weak shoot from the wall, has become large and when from its wood the cradle can be made in which the hero can be rocked The formula reads "A linden shall be planted, which shall bear on high two boughs from the wood of which a "poie" shall be made, the child who will be the first to lie therein is destined to be taken by the sword from life to death, and then salvation will enter in" In the Germanic legends, the appearance of a future event is connected most remarkably with a budding tree Compare with this the designation of Christ as a "branch" or a "rod"

[83] Herein the motive of the "helpful bird" is apparent. Angels are really birds. Compare the bird clothing of the souls of the underworld, "soul birds" In the sacrificium Mithriacum the messenger of the gods (the "angel") is a raven, the winged Hermes, etc.

[84] See Frobenius Ibid

[85] The close connection between δελφίς = Dolphin and δελφύς = uterus is emphasized In Delphi there is a cavity in the earth and the Tripod δελφινίς = a delphic table with three feet in the form of a Dolphin See in the last chapter Melicertes upon the Dolphin and the fiery sacrifice of Melkarth.

[86] See the comprehensive collection of Jones On the nightmare

[87] Riklin · "Wish Fulfilment and Symbolism in Fairy Tales."

[88] Laistner "Das Ratsel der Sphinx"

[89] Freud · *Jahrbuch*, Vol I, June "Mental Conflicts in Children" Collected Papers on Analytical Psychology

[90] Epistola de ara ad Noviomagum reperta," p. 25 Quoted by Grimm : "Mythology," Vol II

[91] Grimm . Ibid , Vol II, p 1041

[92] Compare with that the horses whose tread causes springs to flow

[93] Compare Herrmann "Nord Myth ," p 64, and Fick "Vergleich Worterb d indogerm Sprache," Vol I

[94] Parallel is the mantic significance of the delphic chasm, Mimir s brook, etc "Abyss of Wisdom," see last chapter Hippolytus, with whom his stepmother was enamoured, was placed after death with the wise nymph, Egeria

[95] Example in Bertschinger : *Jahrbuch*, Vol III Part I

[96] Compare the exotic myths given by Frobenius ("Zeitalter des Sonnengottes"), where the belly of the whale is clearly the land of death

[97] One of the fixed peculiarities of the Mar is that he can only get out of the hole, through which he came in This motive belongs evidently as the projected wish motive in the rebirth myth

[98] According to Giessmann "Altorient Text und Bild " Vol I, p 4

[99] Abyss of wisdom, book of wisdom, source of phantasie See below

[100] Cleavage of the mother, see Kaineus , also rift, chasm division of the earth, and so on

[101] "Schopfung und Chaos " Gottingen 1895, p 30

[102] Brugsch Ibid , p 161

[103] In a Pyramid text, which depicts the battle of the dead Pharaoh for the dominance of heaven it reads Heaven weeps the stars tremble the guards of the gods tremble and their servants flee, when they see the king rise as a spirit, as a god, who lives upon his fathers and conquers his mothers " Cited by Dieterich "Mithrasliturgy," p. 100

[104] Book II, p 61

[105] By Ares, the Egyptian Typhon is probably meant

[106] In the Polynesian Maui myth, the act of the sun hero is very plain he robs his mother of her girdle The robbery of the veil in myths of the type of the swan maiden has the same significance In an African myth of Joruba, the sun-hero simply ravishes his mother (Frobenius)

[107] The previously mentioned myth of Halirrhotios, who destroyed himself when he wished to cut down the holy tree of Athens, the Moria contains the same psychology, also the priestly castration (Attis castration) in the service of the great mother The ascetic self-torture in Christianity has its origin, as is self-evident, in these source , because the Christian form of symbol means a very intensive regression to the mother incest

[108] The tearing off from the tree of life is just this sin.

[109] Compare Kuhn "*Herabkunft des Feuers.*"

[110] Nork "Worterbuch s v Mistel "

[111] Therefore in England mistletoe boughs were hung up at Christmas Mistletoe as rod of life Compare Aigremont "Volkserotik und Pflanzenwelt "

[112] Just as the tree has the phallic nature as well as a maternal significance, so in myths the demonic old woman (she may be favourable or malicious) often has phallic attributes, for example, a long toe, a long tooth, long lips, long fingers, pendulous breasts, large hands, feet, and so on This mixture

of male and female motive has reference to the fact that the old woman is a libido symbol like the tree, generally determined as maternal The bisexuality of the libido is expressed in its clearest form in the idea of the three witches, who collectively possessed but one eye and one tooth This idea is directly parallel to the dream of a patient, who represented her libido as twins, one of which is a box, the other a bottle-like object, for eye and tooth represent male and female genitals Relative to eye in this connection, see especially the Egyptian myths referring to tooth, it is to be observed that Adonis (fecundity) died by a boar's tooth, like Siegfried by Hagen's spear. compare with this the Veronese Priapus, whose phallus was bitten by a snake Tooth in this sense, like the snake, is a "negative" phallus.

[113] Compare Grimm: Vol II, Chap iv, p 802 The same motive in another aplication is found in a Low-Saxon legend Once a young ash tree grew unnoticed in the wood. Each New Year's Eve a white knight upon a white horse rides up to cut down the young shoot At the same time a black knight arrives and engages him in combat After a lengthy conflict, the white knight succeeds in overcoming the black knight and the white knight cuts down the young tree But sometime the white knight will be unsuccessful, then the ash will grow, and when it becomes large enough to allow a horse to be tied under it, then a powerful king will come and a tremendous battle will occur (destruction of the world)

[114] Chantepie de la Saussaye: "Lehrbuch der Religionsgeschichte," Vol. II, p 185

[115] Further examples in Frobenius Ibid., passim

[116] See Jensen "Gilgameshepos."

[117] In a Schlesian passionale of the fifteenth century Christ dies on the same tree which was connected with Adam's sin Cited from Zockler Ibid, p 241

[118] For example, animal skins were hung on the sacrificial trees and afterwards spears were thrown at them

[119] "Geschichte der amerikanischen Urreligionen," p 498

[120] Stephens. "Central America" (cited by Muller Ibid, p 498.

[121] Zöckler "Das Kreuz Christi," p. 34

[122] H H Bancroft "Native Races of the Pacific States of North America," II, 506 (Cited by Robertson "Evang Myths," p 139)

[123] Rossellini "Monumenti dell' Egitto, etc" Tom 3 Tav 23 (Cited by Robertson. Ibid., p 142

[124] Zöckler. Ibid, p 7 In the representation of the birth of a king in Luxor one sees the following The logos and messenger of the gods, the bird-headed Thoth, makes known to the maiden Queen Mautmes that she is to give birth to a son. In the following scene, Kneph and Athor hold the Crux ansata to her mouth so that she may be impregnated by this in a spiritual (symbolic) manner Sharp "Egyptian Mythology," p 18 (Cited by Robertson "Evangelical Myths," p 43)

[125] The statues of the phallic Hermes used as boundary stones were often in the form of a cross with the head pointed (W Payne Knight "Worship of Priapus," p 30) In Old English the cross is called rod

[126] Robertson (Ibid, p 140) mentions the fact that the Mexican priests and sacrificers clothed themselves in the skin of a slain woman, and placed themselves with arms stretched out like a cross before the god of war

[127] "Indian Antiquities," VI, 49

[128] The primitive Egyptian cross form is meant T.

[129] Zockler · Ibid, p. 19. The bud is plainly phallic See the above-mentioned dream of the young woman

[130] I am indebted for my information about these researches to Professor Fuchter of Stuttgart

[131] Zöckler Ibid, p 33

[132] The sacrifice is submerged in the water, that is in the mother.

[133] Compare later the moon as gathering place of souls (the devouring mother).

[134] Compare here what Abraham has to say in reference to pupilla (" Dreams and Myths ").

[135] Retreat of Rê upon the heavenly cow. In a Hindoo rite of purification, the penitent must creep through an artificial cow in order to be born anew

[136] Schultze · " Psychologie der Naturvolker " Leipzig 1900, p 338.

[137] Brugsch Ibid, p 290

[138] One need not be amazed at this formula because it is the animal in us, the primitive forces of which appear in religion In this connection Dieterich's words (" Mithrasliturgie " p 108) take on an especially important aspect " The old thoughts come *from below* in new force in the history of religion The revolution *from below* creates a new life of religion in primitive indestructible forms "

[139] Dispute between Mary and the Cross in R Morris · " Legends of the Holy Rood " London 1871

[140] A very beautiful representation of the blood red sun sinking into the sea

[141] Jesus appears here as branch and bud in the tree of life Compare here the interesting reference in Robertson " Evangelical Myths " p 51 in regard to " Jesus, the Nazarene," a title which he derives from Nazar or Netzer branch

[142] In Greece, the pale of torture on which the criminal was stretched or punished, was termed Ἑκάτη (Hecate), the subterranean mother of death

[143] Diez " Etym. Worterbuch der romanischen Sprachen," p 90.

CHAPTER VI

[1] Witches easily change themselves into horses, therefore the nail-marks of the horseshoe may be seen upon their hands The devil rides on witch-horses priests' cooks are changed after death into horses, etc Negelein, *Zeitschrift des Vereines für Volkskunde*, XI, p 406

[2] Just so does the mythical ancient king Tahmuraht ride upon Ahriman, the devil

[3] The she-asses and their foals might belong to the Christian sun myth, because the Zodiacal sign Cancer (Summer solstice) was designated in antiquity as an ass and its young (Compare Robertson. " Evangelical Myths," p 19)

[4] Also a centaur

[5] Compare the exhaustive presentation of this theme in Jähn's " Ross und Reiter "

[6] Sleipnir is eight-footed

[7] Negelein Ibid, p. 412.

[8] Negelein · Ibid, p 419.

[9] I have since learned of a second exactly similar case

[10] Preller. " Griech Mythologie," I, 1, p 432

[11] See further examples in Aigremont. "Fuss- und Schuhsymbolik."

[12] Aigremont: Ibid, p 17

[13] Negelein Ibid., p 386.

[14] Ample proofs of the Centaurs as wind gods are to be found in E H Meyer "Indogermanische Mythen," p 447

[15] This is an especial motive, which must have something typical in it My patient ("Psychology of Dementia Praecox," p 165) also declared that her horses had "half-moons" under their skin, like "little curls" In the songs of Rudra of the Rigveda, of the boar Rudra it is said that his hair was "wound up in the shape of shells" Indra's body is covered with eyes

[16] This change results from a world catastrophe In mythology the verdure and the upward striving of the tree of life signify also the turning-point in the succession of the ages

[17] Therefore the lion was killed by Samson, who later harvested the honey from the body The end of summer is the plenteousness of the autumn. It is a close parallel to the sacrificium Mithriacum For Samson, see Steinthal "Die Sage von Simson," *Zeitschrift für Volkerpsych*," Vol II

[18] Philo "In Genesim," I, 100. (Cited by Cumont: "Textes et Monuments," I, p 82)

[19] Spiegel. "Erân Altertumskunde," Vol II, p 193 In the writings ascribed to Zoroaster, Περὶ Φύσεως, the Ananke, the necessity of fate, is represented by the air. Cumont Ibid., I, p 87

[20] Spielrein's patient (*Jahrbuch*, III, p. 394) speaks of horses, who eat men, also exhumed bodies

[21] Negelein Ibid, p 416.

[22] P Thomas a Villanova Wegener. "Das wunderbare äussere und innere Leben der Dienerin Gottes Anna Catherina Emmerich" Dülmen i W 1891.

[23] The heart of the mother of God is pierced by a sword

[24] Corresponding to the idea in Psalm xi 2, "For lo, the wicked bend their bow, they make ready their arrow upon the string, that they may privily shoot at the upright in heart"

[25] K E Neumann "The Speeches of Gautama Buddha," translated from the German collection of the fragments of Suttanipato of the Pali-Kanon. München 1911

[26] With the same idea of an endogenous pain Theocritus (27, 28) calls the birth throes "Arrows of the Ilithyia" In the sense of a wish the same comparison is found in Jesus Sirach 19 12 "When a word penetrates a fool it is the same as if an arrow pierced his loins" That is to say, it gives him no rest until it is out.

[27] One might be tempted to say that these were merely figuratively expressed coitus scenes But that would be a little too strong and an unjustifiable accentuation of the material at issue We cannot forget that the saints have, figuratively, taught the painful domestification of the brute The result of this, which is the progress of civilization, has also to be recognized as a motive for this action

[28] Apuleius ("Metam," Book II, 31) made use of the symbolism of bow and arrow in a very drastic manner "Ubi primam sagittam saevi Cupidinis in ima praecordia mea delapsam excepi, arcum meum en! Ipse vigor attendit et oppido formido, ne nervus rigoris nimietate rumpatur" (When I pulled out the first arrow of fierce Cupid that had entered into my inmost breast, behold my bow! Its very vigor stretches it and makes me fear lest the string be broken by the excessive tautness)

[29] Thus the plague-bringing Apollo In Old High German, *arrow* is called "strala" (*strahlen*=rays)

[30] Spielrein's patient (*Jahrbuch*, III, p 371) has also the idea of the cleavage of the earth in a similar connection "Iron is used for the purpose of penetrating into the earth . with iron man can create men the earth is split, burst open, man is divided . is severed and reunited In order to make an end of the burial of the living, Jesus Christ calls his disciples to penetrate into the earth"

The motive of "cleavage" is of general significance The Iranian hero Tishtriya, who also appeared as a white horse, opens the rain lake, and thus makes the earth fruitful He is called Tir=arrow He was also represented as feminine, with a bow and arrow Mithra with his arrow shot the water from the rock, so as to end the drought. The knife is sometimes found stuck in the earth In Mithraic monuments sometimes it is the sacrificial instrument which kills the bull (Cumont Ibid., pp 115, 116 165)

[31] Spielrein's patient also states that she has been shot through by God (3 shots) "then came a resurrection of the spirit" This is the symbolism of introversion

[32] This is also represented mythologically in the legend of Theseus and Peirithoos, who wished to capture the subterranean Proserpina With this aim they enter a chasm in the earth in the grove Kolonos, in order to get down to the underworld, when they were below they wished to rest, but being enchanted they hung on the rocks that is to say, they remained fixed in the mother and were therefore lost for the upperworld Later Theseus was freed by Hercules (revenge of Horus for Osiris) at which time Hercules appears in the role of the death-conquering hero

[33] This formula applies most directly to dementia præcox.

[34] See Roscher s v Philoktetes, Sq 2318, 15

[35] When the Russian sun-hero Oleg stepped on the skull of the slain horse a serpent came out of it and bit him on the foot Then he became sick and died When Indra in the form of Çyena, the falcon, stole the soma drink Kriçanu, the herdsman, wounded him in his foot with his arrow (" Rigveda I, 155, IV, 322)

[36] Similar to the Lord of the Grail who guards the chalice the mother symbol The myth of Philoctetes is taken from a more involved connection, the Hercules myth Hercules has two mothers, the benevolent Alcmene and the pursuing Hera (Lamia), from whose breast he has absorbed immortality Hercules conquered Hera's serpent while yet in the cradle, that is to say, conquered the "terrible mother," the Lamia But from time to time Hera sent to him attacks of madness, in one of which he killed his children (Lamia motive) According to an interesting tradition, this deed occurred at the moment when Hercules refused to perform a great act in the service of Eurystheus As a result of the refusal, the libido, in readiness for the work regressed in a typical manner to the unconscious mother imago, which resulted in madness (as to-day), during which Hercules identifies himself with Lamia (Hera) and murders his own children The delphic oracle communicates to him the fact that he is named Hercules because he owes his immortal fame to Hera, who through her persecution compelled him to great deeds It can be seen that "the great deed" really means the conquering of the mother and through her to win immortality His characteristic weapon, the club, he cuts from the maternal olive tree Like the sun, he possessed the arrows of Apollo He conquered the Nemean lion in his cave, which has the signification of "the grave in the mother's womb" (see the end of this chapter). Then follows the combat with the Hydra, the typical battle with the dragon, the complete conquering of the mother (See below) Following this, the capture of the Cerynean doe, whom he wounded with an arrow in the foot This is what generally happens to the

hero, but here it is reversed Hercules showed the captured Erymanthian boar to Eurystheus, whereupon the latter in fear crept into a cask That is, he died The Stymphalides, the Cretan bull, and the man-devouring horse of Diomedes are symbols of the devastating powers of death, among which the latter's relation to the mother may be recognized especially The battle for the precious girdle of the Amazon queen Hippolyte permits us to see once more very clearly the shadow of the mother Hippolyte is ready to give up the girdle, but Hera, changing herself into the form of Hippolyte, calls the Amazons against Hercules in battle (Compare Horus, fighting for the head ornament of Isis, about which there is more later Chap 7) The liberation of Hesione results from Hercules journeying downwards with his ship into the belly of the monster, and killing the monster from within after three days labor. (Jonah motive, Christ in the tomb or in hell; the victory over death by creeping into the womb of the mother, and its destruction in the form of the mother The libido in the form of the beautiful maiden again conquered) The expedition to Erythia is a parallel to Gilgamesh, also to Moses in the Koran, whose goal was the confluence of the two seas it is the journey of the sun to the Western sea, where Hercules discovered the straits of Gibraltar ("to that passage": Faust), and with the ship of Helios set out towards Erythia There he overcame the gigantic guardian Eurytion (Chumbaba in the Gilgamesh epic, the symbol of the father), then the triune Geryon (a monster of phallic libido symbolism), and at the same time wounded Hera, hastening to the help of Geryon by an arrow shot Then the robbery of the herd followed "The treasure attained with difficulty" is here presented in surroundings which make it truly unmistakable Hercules, like the sun, goes to death, down into the mother (Western sea), but conquers the libido attached to the mother and returns with the wonderful kine, he was won back his libido, his life, the mighty possession We discover the same thought in the robbery of the golden apples of Hesperides, which are defended by the hundred-headed dragon The victory over Cerberus is also easily understood as the victory over death by entrance into the mother (underworld). In order to come to his wife Deianira, he has to undergo a terrible battle with a water god Achelous (with the mother). The ferryman Nessus (a centaur) violates Deianira With his sun arrows Hercules killed this adversary, but Nessus advised Deianira to preserve his poisoned blood as a love charm When after the insane murder of Iphitus Delphi denied him the speech of the oracle, he took possession of the sacred tripod The delphic oracle then compelled him to become a slave of Omphale, who made him like a child After this Hercules returned home to Deianira, who presented him with the garment poisoned with Nessus' blood (the Isis snake), which immediately clung so closely to his skin that he in vain attempted to tear it off (The casting of the skin of the aging sun-god, Serpent, as symbol of rejuvenation) Hercules then ascended the funeral pyre in order to destroy himself by fire like the phœnix, that is to say, to give birth to himself again from his own egg No one but young Philoctetes dared to sacrifice the god Therefore Philoctetes received the arrows of the sun and the libido myth was renewed with this Horus

[17] Apes, also, have an instinctive fear of snakes

[18] How much alive are still such primitive associations is shown by Segantini's picture of the two mothers cow and calf, mother and child in the same stable From this symbolism the surroundings of the birthplace of the Saviour are explained

[19] The myth of Hippolytos shows very beautifully all the typical parts of the problem · His stepmother Phaedra wantonly falls in love with him He repulses her, she complains to her husband of violation, the latter implores the water god Poseidon to punish Hippolytos Then a monster comes out of the sea Hippolytos' horses shy and drag Hippolytos to death But he is resuscitated by Aesculapius and is placed by the gods with the wise

nymph Egeria, the counsellor of Numa Pompilius Thus the wish is fulfilled from incest, wisdom has come

[40] Compare Hercules and Omphale.

[41] Compare the reproach of Gilgamesh against Ishtar.

[42] Spielrein's patient is also sick from "a snake bite" *Jahrbuch*, III, p 385.

[43] The entirely introverted patient of Spielrein uses similar images she speaks of "a rigidity of the soul on the cross," of "stone figures" which must be "ransomed"

I call attention here to the fact that the symbolisms mentioned above are striking examples of Silberer's "functional category" They depict the condition of introversion.

[44] W Gurlitt says ' The carrying of the bull is one of the difficult ἆθλα (services) which Mithra performed in the service of freeing humanity; "somewhat corresponding if it is permitted to compare the small with the great, with the carrying of the cross by Christ" (Cumont, "Textes et Monuments," I, 72) Surely it is permissible to compare the two acts

Man should be past that period when in true barbaric manner, he haughtily scorned the strange gods, the "dii minorum gentium." But man has not progressed that far, even yet

[45] Robertson ("Evangelical Myths," p 130) gives an interesting contribution to the question of the symbol of the carrying of the cross Samson carried the "pillars of the gates from Gaza and died between the columns of the temple of the Philistines" Hercules weighted down by his burden, carried his columns to the place (Gades), where he also died according to the Syrian version of the legend The columns of Hercules mark the western point where the sun sinks into the sea In old art he was actually represented carrying the two columns under his arms in such a way that they exactly formed a cross Here we perhaps have the origin of the myth of Jesus, who carries his own cross to the place of execution It is worth noting that the three synoptics substitute a man of the name of Simon from Cyrene as bearer of the cross Cyrene is in Libya, the legendary scene upon which Hercules performed the labour of carrying the columns, as we have seen, and Simon (Simson) is the nearest Greek name-form for Samson, which in Greek might have been read Simson, as in Hebrew. But in Palestine it was Simon, Semo, or Sem, actually a name of a god, who represented the old sun-god Semesch, who was identified with Baal, from whose myth the Samson myth has doubtless arisen The god Simon enjoyed especial honor in Samaria " The cross of Hercules might well be the sun's wheel, for which the Greeks had the symbol of the cross The sun's wheel upon the bas relief in the small metropolis at Athens contains a cross, which is very similar to the Maltese cross." (See Thiele. "Antike Himmelsbilder," 1898, p 59).

[46] The Greek myth of Ixion, who was bound to the "four-spoked wheel," says this almost without disguise Ixion first murdered his stepfather, but later was absolved from guilt by Zeus and blessed with his favor. But the ingrate attempted to seduce Hera, the mother Zeus deceived him, however, allowing the goddess of the clouds, Nephele, to assume Hera's form (From this connection the centaurs have arisen) Ixion boasted of his deed, but Zeus as a punishment plunged him into the underworld, where he was bound to a wheel continually whirled around by the wind (Compare the punishment of Francesca da Rimini in Dante and the "penitents" by Segantini)

[47] Cited from *Zentralblatt für Psychoanalyse*, Jahrgang, II, p 365

[48] The symbolism of death appearing in abundance in dreams has been emphasized by Stekel ("Sprache des Traumes," p. 317).

[49] Compare the Cassius scene above

CHAPTER VII

[1] A direct unconstrained expression of sexuality is a natural occurrence and as such neither unbeautiful nor repulsive The "moral" repression makes sexuality on one side dirty and hypocritical, on the other shameless and obtrusive

[2] Compare what is said below concerning the motive of fettering

[3] The sacrilegious assault of Horus upon Isis, at which Plutarch ("De Isis et Osiris) stands aghast, he expresses himself as follows concerning it "But if any one wishes to assume and maintain that all this has really happened and taken place with respect to blessed and imperishable nature, which for the most part is considered as corresponding to the divine, then to speak in the words of Aeschylus, 'he must spit out and clean his mouth.'" From this sentence one can form a conception of how the well-intentioned people of ancient society may have condemned the Christian point of view, first the hanged God, then the management of the family, the "foundation" of the state The psychologist is not surprised

[4] Compare the typical fate of Theseus and Peirithoos.

[5] Compare the example given for that in Aigremont "Fuss- und Schuhsymbolik" Also Part I of this book, the foot of the sun in an Armenian folk prayer Also de Gubernatis, "Die Tiere in der Indo-Germanischen Mythologie," Vol I, p 220 ff

[6] Rohde "Psyche"

[7] Porphyrius ("De antro nympharum" Quoted by Dieterich "Mithraslit," p 63) says that according to the Mithraic doctrine the souls which pass away at birth are destined for winds, because these souls had taken the breath of the wind into custody and therefore had a similar nature. ψυχαῖς δ' εἰς γένεσιν ἰούσαις καὶ ἀπὸ γενέσεως χωριζομέναις εἰκότως ἔταξαν ἀνέμους διὰ τὸ ἐφελκεσθαι καὶ αὐτὰς πνεῦμα καὶ οὐσίαν ἔχειν τοιαύτην—(The souls departing at birth and becoming separated, probably winds because of inhaling their breath and becoming the same substance)

[8] In the Mithraic liturgy the generating breath of the spirit comes from the sun, probably "from the tube of the sun" (see Part I) Corresponding to this idea, in the Rigveda the sun is called the One-footed Compare with that the Armenian prayer, for the sun to allow its foot to rest upon the face of the suppliant (Abeghian "Der armenische Volksglaube," 1899, p. 41)

[9] Firmicus Maternus (Mathes, I, 5, 9): "Cui (animo) descensus per orbem solis tribuitur, per orbem vero lunae praeparatur ascensus" (For which soul a descent through the disc of the sun is devised, but the ascent is prepared through the disc of the moon) Lydus ("De mens," IV, 3) tells us that the hierophant Praetextatus has said that Janus despatches the diviner souls to the lunar fields: τὰς θειοτέρας ψυχὰς ἐπὶ τὴν σεληνικὸν χόρον ἀποπέμπει Epiphanius (Haeres LXVI, 52): ὅτι ἐκ τῶν ψυχῶν ὁ δίσκος (τῆς σελήνης) ἀποπίμπλαται. Quoted by Cumont "Textes et Monuments," I, I, p 40 In exotic myths it is the same with the moon Frobenius Ibid, p 352 ff

[10] "The Light of Asia, or The Great Renunciation" (Mahâbhinishkramana).

[11] One sees upon corresponding representations how the elephant presses into Maya's head with its trunk

[12] Rank: "The Myth of the Birth of the Hero," translated by W White

[13] The speedy dying of the mother or the separation from the mother belongs to the myth of the hero In the myth of the swan maiden which Rank has analyzed very beautifully, there is the wish-fulfilling thought, that the swan maiden can fly away again after the birth of the child, because she has then fulfilled her purpose Man needs the mother only for rebirth.

[14] Indian word for the rustle of the wind in the trees

[15] Means sound of the waves

[16] An introjection of object into the subject in the sense of Ferenczi, the "gegenwurf" or "widerwurf" (Objektum) of the mystics Eckart and Böhme

[17] Karl Joël ("Seele und Welt," Jena 1912) says (p 153) "Life does not diminish in artists and prophets but is enhanced They are the leaders into the lost Paradise, which now for the first time becomes Paradise through rediscovery It is no more the old dull unity of life towards which the artist strives and leads, it is the sentient reunion, not the empty but the full unity not the unity of indifference but the unity of difference" "All life is the raising of the equilibrium and the pulling backwards into equilibrium Such a return do we find in religion and art"

[18] By the primal experience must be understood that first human differentiation between subject and object, that first conscious placing of object which is not psychologically conceivable without the presupposition of an inner division of the animal "man" from himself, by which precisely is he separated from nature which is at one with itself

[19] Crêvecoeur "Voyage dans la Haute Pensylvanie," I, 362

[20] The dragons of the Greek (and Swiss) legends live in or near springs or other waters of which they are often the guardians

[21] Compare the discussion above about the encircling and devouring motive Water as a hindrance in dreams seems to refer to the mother, longing for the mother instead of positive work The crossing of water— overcoming of the resistance, that is to say the mother as a symbol of the longing for inactivity like death or sleep

[22] Compare also the Attic custom of stuffing a bull in spring the customs of the Lupercalia Saturnalia, etc. I have devoted to this motive a separate investigation, therefore I forego further proof

[23] In the Gilgamesh epic, it is directly said that it is immortality which the hero goes to obtain

[24] Sepp "Das Heidentum und dessen Bedeutung für das Christentum," Vol III, 82

[25] Compare the symbolism of the arrow above

[26] This thought is generally organized in the doctrine of pre-existence Thus in any case man is his own generator, immortal and a hero, whereby the highest wishes are fulfilled

[27] Frazer "Golden Bough," IV, 297

[28] "Thou seekest the heaviest burden, there findest thou thyself (Nietzsche "Zarathustra")

[29] It is an unvarying peculiarity, so to speak, that in the whale-dragon myth, the hero is very hungry in the belly of the monster and begins to cut off pieces from the animal, so as to feed himself He is in the nourishing mother "in the presexual stage" His next act in order to free himself, is to make a fire In a myth of the Eskimos of the Behring Straits, the hero finds a woman in the whale's belly, the soul of the animal, which is feminine (Ibid, p. 85). (Compare Frobenius Ibid, passim)

[30] The carrying of the tree played an important part, as is evident from a note in Strabo X, in the cult of Dionysus and Ceres (Demeter)

[31] A text on the Pyramids, which treats of the arrival of the dead Pharaoh in Heaven, depicts how Pharaoh takes possession of the gods in order to assimilate their divine nature, and to become the lord of the gods "His servants have imprisoned the gods with a chain, they have taken them and

dragged them away, they have bound them, they have cut their throats, and taken out their entrails, they have dismembered them and cooked them in hot vessels And the king consumed their force and ate their souls The great gods from his breakfast, the medium gods his dinner, the little gods his supper—the king consumes everything that comes in his way Greedily he devours everything and his magic power becomes greater than all magic power He becomes the heir of the power, he becomes greater than all heirs, he becomes the lord of heaven, he eats all crowns and all bracelets, he eats the wisdom of every god, etc." (Wiedemann "Der alte Orient," II, 2, 1900, p. 18) This impossible food, this "Bulimie," strikingly depicts the sexual libido in regression to the presexual material, where the mother (the gods) is not the object of sex but of hunger

[32] The sacramental sacrifice of Dionysus-Zagreus and the eating of the sacrificial meat produced the "νευς Διόνυσος" the resurrection of the god, as plainly appears from the Cretan fragments of the Euripides quoted by Dieterich (Ibid., p 105 ·

ἁγνὸν δὲ βίον τείνων, ἐξ οὗ
Διὸς Ἰδαίου μύστης γενόμην
καὶ νυκτιπόλου Ζαγρέως βούτας
τοὺς ὠμοφάγους δαῖτας τελέσας,

(Living a blameless life whereby I became an initiate of the Idaean Zeus, I celebrated the carnivorous banquet of Zagreus, the wandering herdsman of the night.)

The mystics took the god into themselves by eating the uncooked meat of the sacrificial animal

[33] Richter · 14, 14.

[34] Orphic Hymn, 46 Compare Roscher · "Lexicon," sect on Iakchos.

[35] A close parallel to this is the Japanese myth of Izanagi, who, following his dead spouse into the underworld, implored her to return She is ready, but beseeches him, "Do not look at me" Izanagi produces light with his reed, that is to say, with a masculine piece of wood (the fire-boring Phallus), and thus loses his spouse (Frobenius Ibid, p 343) Mother must be put in the place of spouse Instead of the mother, the hero produces fire, Hiawatha, maize, Odin, Runes, when he in torment hung on the tree

[36] Quoted from De Jong "Das antike Mysterienwesen" Leiden 1910, p 22

[37] A son-lover from the Demeter myth is Iasion, who embraces Demeter upon a thrice-ploughed cornfield (Bridal couch in the pasture) For that Iasion was struck by lightning by Zeus (Ovid. "Metam," IX).

[38] See Cumont "Textes et Monuments," I, p. 56

[39] "Mithraslit," p. 123.

[40] For example upon a Campana relief in Lovatelli ("Antichi monumenti," Roma, 1889, I, IV, Fig 5) Likewise the Veronese Priapus has a basket filled with phalli

[41] Compare Grimm II, IV, p. 899 Either by the caressing or kissing of a dragon or a snake, the fearful animal was changed into a beautiful woman whom the hero wins in this way

[42] The mother, the earth, is the distributor of nourishment The mother in presexual material has this meaning Therefore St Dominicus was nourished from the breasts of the mother of God The sun wife, Namaqua consists of bacon Compare with this the megalomanic ideas of my patient, who asserted "I am Germania and Helvetia made exclusively from 'sweet butter'" ("Psychology of Dementia Praecox").

[43] Compare the ideas of Nietzsche: "Piercing into one's own pit," etc. In a prayer to Hermes in a London papyrus it is said: ἐλθέ μοι κύριε Ἑρμῆ, ὡς τὰ βρέφη εἰς τὰς κοιλίας τῶν γυναικῶν (Come to me, Lord Hermes, as the foetus into the womb of the mother). Kenyon: "Greek Papyrus in the British Museum," 1893, p. 116, Pap. CXXII, Z. 2 ff. Cited by Dieterich: Ibid., p. 97.

[44] Compare De Jong: Ibid., p. 22.

[45] The typical grain god of antiquity was Adonis, whose death and resurrection was celebrated annually. He was the son-lover of the mother, for the grain is the son and fructifier of the womb of the earth, as Robertson very correctly remarks ("Evangelical Myths," p. 36).

[46] De Jong: Ibid., p. 14.

[47] Faust:

"There whirls the press, like clouds on clouds unfolding,
Then with stretched arm swing high the key thou'rt holding!"

[48] As an example among many, I mention here the Polynesian Rata myth cited by Frobenius: Ibid., pp. 64-66. "With a favorable wind the boat was sailing easily away over the Ocean, when Nganaoa called out one day: 'O Rata, here is a fearful enemy who rises up from the Ocean!' It was an open mussel of huge dimensions. One shell was in front of the boat, the other behind it, and the vessel was directly between. The next moment the horrible mussel would have clapped its shells together and ground the boat and occupants to pieces in its grip. But Nganaoa was prepared for this possibility. He grasped his long spear and quickly plunged it into the belly of the animal so that the creature, instead of snapping together, at once sank back to the bottom of the sea. After they had escaped from this danger they continued on their way. But after a while the voice of the always watchful Nganaoa was again to be heard: 'O Rata, once more a terrible enemy rushes upwards from the depths of the ocean.' This time it was a mighty octopus, whose gigantic tentacles already surrounded the boat, in order to destroy it. At this critical moment, Nganaoa seized his spear, and plunged it into the head of the octopus. The tentacles sank away limp and the dead monster rose to the surface of the water. Once more they continued on their journey, but a yet greater danger awaited them. One day the valiant Nganaoa called out, 'O Rata, here is a great whale!' The huge jaws were wide open, the lower jaw was already under the boat, and the upper one over it. One moment more and the whale would have devoured them. Now Nganaoa 'the dragon slayer' broke his spear into two parts, and at the moment when the whale was about to devour them, he stuck the two pieces into the jaws of the foe so that he could not close his jaws. Nganaoa quickly sprang into the jaws of the great whale *(devouring of the hero)* and looked into its belly, and what did he see? There sat both his parents, his father, Tairitokerau, and his mother, Vaiaroa, who had been gulped down into the depths of this monster. The oracle has come true. The voyage has come to its end. Great was the joy of the parents of Nganaoa when they saw their son. They were convinced that their freedom was at hand. And Nganaoa resolved upon revenge. He took one of the two pieces from the jaws of the animal—one was enough to make it impossible for the whale to close his jaws and so keep a passage free for Nganaoa and his parents. He broke this part of the spear in two, in order to use them as wood to produce fire by rubbing. He commanded his father to hold one firmly below, while he himself managed the upper one, until the fire began to glimmer (production of fire). Now when he blew this into flames, he hastened to heat the fatty part (heart) of the belly with the fire. The monster, writhing with pain, sought help swimming to the nearest land (journey in the sea). As soon as he reached the sand-bank (land) father, mother and son walked on to the land through the open jaws of the dying whale (slipping out of the hero)."

[49] In the New Zealand Maui myth (quoted by Frobenius: Ibid, p 66 ff) the monster to be conquered is the grandmother Hine-nui-te-po Maui the hero, says to the birds who assist him: 'My little friends, now when I creep into the jaws of the old woman, you must not laugh, but when I have been in and come out again, from her mouth, then you may greet me with jubilant laughter." Then Maui actually creeps into the mouth of the sleeping old woman

[50] Published and prepared by Julius v Negelein, in "Relig Geschichte" Vers u Vorarb von Dieterich und Wünsch, Vol XI Giessen 1912.

[51] Quoted, J v Negelein "Der Traumschlussel des Jagaddeva," p 256.

[52] The pine-tree speaks the significant word, "Minne-wawa!"

[53] In a fairy tale, the bird comes to the tree which grows upon the grave of the mother in order to give help

[54] Roscher: s. "Picus," Sp 2494, 62 Probably a symbol of rebirth

[55] The father of Picus is called Sterculus or Sterculius, a name which is clearly derived from stercus=excrementum, he is also said to be the devisor of manure The primitive creator who also created the mother did so in the manner of infantile creation, which we have previously learned The supreme god laid an egg, his mother, from which he was again produced—this is an analogous train of thought.

[56] Introversion=to enter the mother; to sink into one's own inner-world or source of the libido, is symbolized by creeping in, passing through, boring (Scratching behind the ear=making fire) Boring into the ear, scratching with the nails, swallowing serpents Thus the Buddhist legend is understandable When Gautama had spent the whole day sitting in deep reflection under the sacred tree, at evening he became Buddha, the illumined one.

[57] Compare φαλλός (phallus) above and its etymological connection

[58] Spielrein's patient received from God three wounds through her head breast and eye "Then there came a resurrection of the Spirit" (*Jahrbuch*, III, p 376)

In the Tibetan myth of Bogda Gesser Khan the sun-hero shoots his arrow into the forehead of the demoniacal old woman, who devours it and spits it up again In a Calmuc myth, the hero shoots the arrow into the eye emitting rays, which is found on the forehead of the bull Compare with that the victory of Polyphemus, whose character is signified upon an Attic vase because with it there is also a snake (as symbol of the mother. See the explanation of the sacrificium Mithriacum)

[59] In the form of the father, for Megissogwon is the demon of the west, like Mudjekeewis

[60] Compare Deussen: "Geschichte der Philosophie," Vol I, p 14

[61] An analogy is Zeus and Athene In Rigveda 10, 31, the word of prayer becomes a pregnant cow In Persian it is the "Eye of Ahura"; Babylonian *Nabu*: the word of fate, Persian *vohu mano* the good thought of the creator God, in Stoic conceptions, Hermes is *logos* or world intellect, in Alexandria the Σοφία, in the Old Testament it is the angel of Jehovah, or the countenance of God Jacob wrestled with the angel during the night at the ford of Jabbok, after he had crossed the water with all that he possessed (Night journey on the sea, battle with the night snake, combat at the ford like Hiawatha) In this combat, Jacob dislocated his thigh (Motive of the twisting out of the arm. Castration on account of the overpowering of the mother) This "face" of God was compared in the old Jewish philosophy to the mystic Metatron, the prince of the face of God (Josiah 5, 14), who brings "the prayer to God" and "in whom is the name of God" The Naassens (Ophites) called the Holy Ghost the "first word," the mother of all that lives, the Valentinians comprehended the descending dove of Pneuma as "the word of the mother from above, the Sophia" (Drews "Christ Myth' I, pp 16, 22, 80) In Assyria, Gibil, the fire god, had the rôle of Logos (Tiele "Assyr Gesch" (In Ephrem, the Syrian writer of hymns,

John the Baptist says to Christ "A spark of fire in the air waits for thee over the Jordan. If thou followest it and wilt be baptized, then take possession of thyself, wash thyself, for who has the power to take hold of burning fire with his hands? Thou, who art wholly fire, have mercy upon me" Usener, "Religionsgeschichtliche Untersuchungen" Cited by Drews. Ibid, p 81

[62] Perhaps the great significance of the name arose from this phantasy

[63] Grimm mentions the legend that Siegfried was suckled by a doe (Compare Hiawatha's first deed)

[64] Compare Grimm's "Mythology" Mime or Mimir is a gigantic being of great wisdom, "a very old Nature God," with whom the Norse gods associate. Later fables make of him a demon and a skilful smith (closest relation to Wieland) Just as Wotan obtained advice from the wise woman (compare the quotation from Julius Cæsar about the German matron), so does Odin go to the brook of Mimir in which wisdom and judgment lie hidden to the spiritual mother (mother imago) There he requests a drink (drink of immortality), but no sooner does he receive it than he sacrifices his eye to the well (death of the sun in the sea) The well of Mimir points undoubtedly to the mother significance of Mimir Thus Mimir gets possession of Odin's other eye In Mimir, the mother (wise giant) and the embryo (dwarf subterranean sun Harpocrates) is condensed, likewise as mother he is the source of wisdom and art ("Mother-imago" therefore may be translated as "phantasy" under certain circumstances)

[65] The magic sleep is also present in the Homeric celebration of the Hieros gamos See above)

[66] This is proved by Siegfried's words

"Through furious fire
To thee have I fared,
Nor birny nor buckler
Guarded my breast
The flames have broken
Through to my heart
My blood doth bound
In turbulent streams,
A raving fire
Within me is kindled"

[67] The cave dragon is the "terrible mother" In the German legends the maiden to be rescued often appears as a snake or dragon, and must be kissed in this form, through which the dragon is changed into a beautiful woman. A fish's or a serpent's tail is attributed to certain wise women In the "golden mountain" a king's daughter was bewitched into a snake In the Oselberg near Dinkelsbuhl there lives a snake with a woman's head and a bunch of keys around her neck (Grimm)

[68] Faust (II Part)

Doch im Erstarren such ich nicht mein Heil,
Das Schaudern ist der Menschheit bestes Teil;
Wie auch die Welt ihm das Gefühl verteure
Ergriffen, fuhlt er tief das Ungeheure

[69] "Etymol Worterbuch der deutschen Sprache," sub Hort

[70] "Griechische Etymologie," sub κεύθω.

[71] Pausanias I, 18, 7

[72] Rohde "Psyche," IV Aufl, Vol I, p 214

[73] J Maehly "Die Schlange im Mythus und Kultus der klassischen Volker" 1867.

[74] Duchesne "Lib pontifical, I, S, CIX. Cited by Cumont "Textes et Monuments, Vol I, p 351

[75] Cited by Cumont "Textes et Monuments, Vol I, p. 351

[76] Like his counterpart, the apocalyptic "son of man," from whose mouth proceeds a "sharp two-edged sword" Rev i 16 Compare Christ as serpent and the Antichrist seducing the people Rev xx 3 We come across the same motive of the guardian dragon who pierces women, in the myth from Van Diemen's Land: "A horn-back lay in the cavity of a rock, a huge horn-back! The horn-back was large and he had a very long spear. From his cavity he espied the women; he saw them dive into the water, he pierced them with his spear, he killed them, he carried them away For some time they were to be seen no longer" The monster was then killed by the two heroes. They made fire (!) and brought the women to life again (Cited by Frobenius Ibid, p 77)

[77] The eyes of the Son of man are like a flame of fire Rev i 15.

[78] Cited by Cumont: "Textes et Monuments," I, p. 352

[79] Compare Roscher: "Lexicon, I, 2, 1885

[80] The triple form also related to the moon (waxing full, and waning moon). However, such cosmic relations are primarily projections of metapsychology.

[81] Faust (II Part) The Scene of the mothers The key belongs to Hecate, προθυραία, as the guardian of Hades, and psychopompic Divinity. Compare Janus, Peter and Aion

[82] Attribute of the "terrible mother" Ishtar has "tormented the horse with goad and whip and tortured him to death" (Jensen "Gilgamesh Epic," p. 18) Also an attribute of Helios.

[83] Phallic symbol of fear

[84] Murderous weapon as symbol of the fructifying phallus

[85] Plato has already testified to this as a phallic symbol as is mentioned above

[86] Cited by Roscher I, 2, Sp. 1909

[87] Compare the symbolism in the hymn to Mary of Melk (12th century).

"Santa Maria,
Closed gate
Opened to God's command—
Sealed fountain,
Barred garden,
Gate of Paradise"

The same symbolism occurs in an erotic verse:

"Maiden may I enter with you
Into your rose garden,
There, where the little red roses grow,
Those delicate and tender roses,
With a tree close by
Whose leaves sway to and fro,
And a cool little brook
Which lies directly beneath it

[88] Herzog: "Aus dem Asklepieion von Kos" *Archiv für Religionswissenschaft*, Vol X, H 2, p 219 ff

[89] A Mithraic sanctuary was, when at all possible, a subterranean grotto; often the cavern was merely an artificial one It is conceivable that the Christian crypts and subterranean churches are of similar meaning

[90] Compare Schultze "Die Katakomben, 1882, p 9

[91] In the Taurobolia a bull was sacrificed over a grave, in which lay the

one to be consecrated. His initiation consisted in being covered with the blood of the sacrifice. Also a regeneration and rebirth, baptism. The baptized one was called *Renatus*.

[92] Additional proof in Herzog. Ibid., p. 224.

[93] Ibid., p. 225.

[94] Indeed sacred serpents were kept for display and other purposes.

[95] Rohde: "Psyche," chap. I, p. 244.

[96] Vol. I, p. 28.

[97] Fick. Compare "Wörterbuch" I, p. 424.

[98] Compare the stable cleaning of Hercules. The stable, like the cavern, is a place of birth. We find stable and cavern in Mithracism combined with the bull symbolism as in Christianity. (See Robertson: "Christ and Krishna.") In a Basuto myth, the stable birth also occurs. (Frobenius.) The stable birth belongs to the mythologic animal fable; therefore the legend of the conceptio immaculata allied to the history of the impregnation of the barren Sarah, appears very early in Egypt as an animal fable. Herodotus III, 28, relates: "This Apis or Epaphos is a calf whose mother was unable to become impregnated, but the Egyptians said that a ray from heaven fell upon the cow, and from that she brought forth Apis." Apis symbolizes the sun, therefore his signs: upon the forehead a white spot, upon his back a figure of an eagle, upon his tongue a beetle.

[99] According to Philo, the serpent is the most spirited of all animals; its nature is that of fire, the rapidity of its movements is great and thus without need of any especial limbs. It has a long life and sheds age, with its skin. Therefore it was inculcated in the mysteries because it is immortal. (Maehly: "Die Schlange in Mythologie und Kultus der klassischen Völker," 1867, p. 7.)

[100] For example, the St. John of Quinten Matsys (see illustration); also two pictures by an unknown Strassburg master in the Gallery at Strassburg.

[101] "And the woman—having a golden cup in her hand full of abominations and filthiness of her fornication." (Rev. xvii, 4.) The woman is "drunken with the blood of the saints and with the blood of the martyrs of Jesus"—a striking image of the terrible mother (here, cup=genitals). In the Tibetan myth of Bogda Gesser Khan there is a beetle (treasure attainable with difficulty), which the demoniac old woman guards. Gesser says to her: "Sister, never since I was born have you shown me the beetle my soul." The mother libido is also the soul. It is significant that the old woman desired the hero as a husband. (Frobenius.)

[102] This is also the significance of the mysteries. Their purpose is to lead the useless, regressive incestuous libido over the bridges of symbolism into rational activity, and through that transform the obscure compulsion of the libido working up from the unconscious into social communion and higher moral endeavour.

[103] An excellent example of this is the description of the orgies of the Russian sectarian by Mereschkowski, in his book, "Peter the Great and Alexei." In the cult of the Asiatic Goddesses of love (Anaitis, Mylitta, etc.), prostitution in the temple was an organized institution. The orgiastic cult of Anâhita (Anaitis) has been preserved in modern sects, with the Ali Illâhija, the so-called "extinguishers of light"; with the Yezîds and Dushikkurds, who celebrate nocturnal religious orgies which end in a wild sexual debauch, during which incestuous unions also occur. (Spiegel: "Erân. Altertumskunde," II, p. 64.) Further examples are to be found in the valuable work of Stoll ("Das Sexualleben in der Völkerpsychologie," Leipzig 1908).

[104] Concerning the kiss of the snake, compare Grimm, II, p. 809. By this means, a beautiful woman was set free. The sucking refers to the maternal significance of the snake, which exists along with the phallic. It

is a coitus act on the presexual stage Spielrein's insane patient (*Jahrbuch*, III, p 344) says as follows "Wine is the blood of Jesus —The water must be blessed, and was blessed by him The one buried alive becomes the vineyard That wine becomes blood—the water is mingled with 'childishness' because God says, 'become like little children' There is also a spermatic water which can be drunken with blood That perhaps is the water of Jesus" Here we find a commingling of all the various meanings of the way to win immortality Wiedemann ("Der alte Orient," II, 2, p 18, cited by Dieterich Ibid, p 101) asserts that it is an Egyptian idea that man draws in the milk of immortality by suckling the breast of a goddess (Compare with that the myth of Hercules, where the hero attains immortality by a single draw at the breast of Hera)

[105] From the writings of the sectarian Anton Unternährer "Geheimes Reskript der bernischen Regierung an die Pfarr- und Statthalterämter," 1821 I owe the knowledge of this fragment to Rev Dr O Pfister.

[106] Nietzsche "Zarathustra" "And I also give this parable to you· Not a few who wished to drive out the devil from themselves, by that lead themselves into the slough"

[107] Compare the vision of Zosimos

[108] The significance of the communion ritual as a unio mystica with God is at bottom sexual and very corporeal The primitive significance of the communion is that of a Hierosgamos Therefore in the fragment of the Attis mysteries handed down by Firmicus it is said that the mystic eats from the Tympanon, drinks from the Kymbalon, and he confesses ὑπὸ τὸν παστὸν ὑπέδυον, which means the same as· "I have entered the bridal chamber" Usener (in Dieterich · Ibid, p 126) refers to a series of quotations from the patristic literature, of which I mention merely one sentence from the speeches of Proclus of Constantinople ἡ παστὰς ἐν ᾗ ὁ λόγος ἐνυμφεύσατο τὴν σάρκα (The bridal chamber im which the Logos has espoused the flesh) The church is also to some extent the bridal chamber, where the spirit unites with the flesh, really the Cömeterium Irenaeus mentions some more of the initiatory customs of certain gnostic sects which were undoubtedly nothing but spiritual weddings (Compare Dieterich Ibid, p 127 ff) In the Catholic church, even yet, a Hierosgamos is celebrated on the installation of a priest A young maiden there represents the church as bride

[109] Compare also the phantasies of Felicien Rops The crucified Priapus

[110] Compare with that the symbolism in Nietzsche's poem "Why enticest thou thyself into the paradise of the old serpent?"

[111] "Thus spake Zarathustra"

[112] Nietzsche himself must have shown at times a certain predilection for loathsome animals Compare C A Bernoulli "Franz Oberbeck und Friedrich Nietzsche," Vol I, p 166

[113] I recall Nietzsche's dream, which is cited in Part I of this book

[114] The Germanic myth of Dieterich von Bern, who had fiery breath, belongs to this idea. He was wounded in the forehead by an arrow, a piece of which remained there fixed, from this, he was called the immortal In a similar manner, half of Hrûngnir's wedge-shaped stone fastened itself in Thor's head See Grimm "Mythology," I, p 309

[115] "Geschichte der Philosophie," Vol I, p. 181.

[116] Sa tapo atapyata

[117] The Stoic idea of the creative primal warmth, in which we have already recognized the libido (Part I, Chap. IV), belongs in this connection, also the birth of Mithra from a stone, which resulted *solo aestu libidinis* (through the heat of the libido only)

[118] In the accurate prose translation this passage reads "There Kâma

developed from him in the beginning" (Deussen "Gesch d Phil," Vol I, p 123) Kama is the libido "The sages found the root of being in the non-being, in the heart, searching with introspection"

[119] "Fame and Eternity"

[120] Grimm "Mythology," III The heroes have serpent's eyes, as do the kings ormr i auga Sigurdr is called Ormr i Auga

[121] Nietzsche's

"In the green light,
Happiness still plays around the brown abyss
His voice grows hoarse,
His eye flashes verdigris!"

[122] From "The Poverty of the Richest"

[123] Nietzsche's "Fragments of Dionysus Dithyrambs."

"Heavy eyes
Which seldom love
But when they love, it flashes out
Like a gold mine
Where a dragon guards the treasure of love"

[124] He is pregnant with the sun.

[125] Galatians iii 27 alludes to this primitive idea "For as many of you as have been baptized into Christ have *put on* Christ"

[126] Just as is Mîni so is Marsyas a crucified one (see Robertson "Evangelical Myths," p 66) Both were hung, a punishment which has an unmistakable symbolic value, because the suspension ("to suffer and fear in the torment of suspension") is the symbol of an unfilfilled wish (See Freud "The Interpretation of Dreams") Therefore Christ Odin, Attis hung on trees (=mother) The Talmudic Jesus ben Pandira (apparently the earliest historic Jesus) suffered a similar death, on the eve of a Passover festival in the reign of Alexander Jannaeus (106-79 B C) This Jesus may have been the founder of the "Essenes," a sect (see Robertson, "Evang Myths," p 123) which stood in a certain relation to subsequent Christianity The Jesus ben Stada identified with the preceding Jesus, but removed into the second Christian century, was also hung Both were first stoned, a punishment which was, so to speak, a bloodless one like hanging The Christian church, which spills no blood, therefore burned This may not be without significance for a peculiar ceremony reported from Uganda "When a king of Uganda wished to live forever, he went to a place in Busiro, where a feast was given by the chiefs At the feast the Mamba Clan was especially held in honor, and during the festivities a member of this clan was secretly chosen by his fellows, caught by them, and beaten to death with their fists, no stick or other weapon might be used by the men appointed to do the deed After death, the victim's body was flayed and the skin made into a special whip, etc After the ceremony of the feast in Busiro, with its strange sacrifice, the king of Uganda was supposed to live forever, but from that day he was never allowed to see his mother again (Quoted from Frazer "Golden Bough," Part IV, p 415) The sacrifice, which is chosen to purchase everlasting life for another, is here given over to a bloodless death and after that skinned That this sacrifice has an absolutely unmistakable relation to the mother—as we already know—is corroborated very plainly by Frazer

[127] Frazer "Adonis, Attis, Osiris," p 242

[128] Frazer Ibid, p 246

[129] Frazer Ibid, p 249

[130] Cited by Dieterich in "Mithrasliturgie," p 215

[131] Another attempt at solution seems to be the Dioscuri motive The sun consists of two brothers similar to each other, the one mortal, the other

immortal This motive is found, as is well known, in the two Açvins, who, however, are not further differentiated In the Mithraic doctrine, Mithra is the father, Sol the son, and yet both are one as ὁ μεγας θεὸς Ἥλιος Μίθρας The motive of twins emerges, not infrequently, in dreams In a dream, where it is related that a woman had given birth to twins, the dreamer found, instead of the expected children, a box and a bottle-like object Here the twins had male and female significance This observation hints at a possible significance of the Dioscuri as the sun and its re bearing mother—daughter (?)

[132] Among the daughters of the desert

[133] *Zentralblatt fur Psychoanalyse*, Vol II, p 169

[134] This problem has frequently been employed in the ancient sun myths It is especially striking that the lion-killing heroes, Samson and Hercules, are weaponless in the combat The lion is the symbol of the most intense summer heat, astrologically he is the Domicilium Solis Steinthal (*Zeitschrift fur Volkerpsychologie*, Vol II, p 133) reasons about this in a most interesting manner, which I quote word for word

"When the Sun-god fights against the summer heat, he fights against himself, when he kills it, he kills himself Most certainly ! The Phœnician, Assyrian and Lydian ascribes self-destruction to his sun-god, for he can comprehend the lessening of the sun's heat only as a self-murder He believed that the sun stood at its highest in the summer and its rays scorched with destroying heat thus does the god burn himself, but he does not die, only rejuvenates himself —Also Hercules burns himself, but ascends to Olympus in the flames This is the contradiction in the pagan gods They, as forces of nature, are helpful as well as harmful to men In order to do good and to redeem they must work against themselves The opposition is dulled, when either of the two sides of the forces of nature is personified in an especial god, or when the power of nature is conceived of as a divine personage, however, each of its two modes of action, the benevolent and the injurious, has an especial symbol The symbol is always independent, and finally is the god himself, and while originally the god worked against himself, destroyed himself, now symbol fights against symbol, god against god, or the god with the symbol"

Certainly the god fights with himself with this other self, which we have conceived of under the symbol of mother The conflict always appears to be the struggle with the father and the conquering of the mother

[135] The old Etruscan custom of covering the urn of ashes, and the dead buried in the earth with the shield, is something more than mere chance

[136] Incest motive

[137] Compare the idea of the Phœnix in the Apocalypse of Baruch, Part I of this book

CHAPTER VIII

[1] The kingdom of the mother is the kingdom of the (unconscious) phantasy

[2] Behind nature stands the mother, in continuation of our earlier discussions and in the foregoing poem of Holderlin Here the mother hovers before the poet's mind as a tree, on which the child hangs like a blossom

[3] Once he called the "stars his brothers" Here I must call to mind the remarks in the first part of this work, especially that mystic identification with the stars ἐγώ εἰμι σύμπλανος ὑμῖν ἀστήρ (I am a star who wanders together with you) The separation and differentiation from the mother, the "individuation" creates that transition of the subjective into the objective, that foundation of consciousness Before this, man was one with the mother That is to say, with the world as a whole At that period man did not know the sun as brother This occurred for the first time, when after the resulting separation and placing of the object, the libido, regressing to the infantile,

perceived in that first state its possibilities and the suspicion of his relationship to the stars forced itself upon him This occurrence appears not infrequently in the introversion psychoses A young peasant an ordinary labouring man developed an introversion psychosis (Dementia Praecox) His first feelings of illness were shown by a special connection which he felt with the sun and the stars The stars became full of meaning to him and the sun suggested ideas to him This apparently entirely new perception of nature is met with very often in this disease Another patient began to understand the language of birds, which brought him messages from his beloved (mother) Compare Siegfried

[4] The spring belongs to the idea as a whole

[5] This idea expresses the divine infantile blessedness, as in Hyperion's "Song of Fate"

> "You wander above there in the light
> Upon soft clouds, blessed genii!
> Shining breezes of the gods
> Stir you gently"

[6] This portion is especially noteworthy In childhood everything was given him, and man is disinclined to obtain it once more for himself, because it is won only through "toil and compulsion" even love costs trouble In childhood the well of the libido gushes forth in bubbling fulness In later life it involves hard work to even keep the steam flowing for the onward striving life, because with increasing age the stream has a growing inclination to flow back to its source, if effectual mechanisms are not created to hinder this backward movement or at least to organize it In this connection belongs the generally accepted idea, that love is absolutely spontaneous The love of an adult man allows itself to be purposely directed Man can also say "I will love" The heights of culture are conditioned by *the capacity for displacement of the libido*

[7] Motive of immortality in the fable of the death of Empedocles Horace *Deus immortalis haberi—Dum cupit Empedocles ardentem frigidus Aetnam—Insiluit* (Empedocles deliberately threw himself into the glowing Aetna because he wanted to be believed an immortal god)

[8] Compare the beautiful passage in the journey to Hades of Odysseus, where the hero wishes to embrace his mother

> "But I, thrilled by inner longing,
> Wanted to embrace the soul of my departed mother
> Three times I endeavoured, full of passionate desire for the embrace
> Three times from my hands she escaped
> Like nocturnal shades and the images of dreams
> And in my heart sadness grew more intense" ("Odyss," XI, 204)

The underworld, hell, is indeed the place of unfulfilled longing The Tantalus motive is found through all of hell

[9] Spielrein's patient (*Jahrbuch*, III, p 345) speaks in connection with the significance of the communion of "the water mixed with childishness, spermatic water, blood and wine" P 368 she says "The souls fallen into the water are saved by God, they fall into the deep abyss - The souls were saved by the son of God"

[10] The φάρμακον ἀθανασίας, the drink of Soma, the Haoma of the Persians, might have been made from Ephedra vulgaris Spiegel "Erân Altertumskunde," I, p 433

[11] Like the heavenly city in Hauptmann's "Hannele".

> "Salvation is a wonderful city,
> Where peace and joy never end,
> Its houses are marble, its roofs are gold,
> But wine flows in silver fountains,

Flowers are strewed upon the white, white streets,
Continually from the towers sound the wedding bells
Green as May are the battlements, shining with the light of early morning
Giddy with butterflies, crowned with roses.

. .

There below, hand in hand,
The festive people wander through the heavenly land
The wide, wide sea is filled with red, red wine,
They plunge in with shining bodies !
They plunge into the foam and the splendour,
The clear purple covers them entirely,
And they exulting arise from the flood,
Thus they are washed by Jesus' blood."

[12] Richter 15 17

[13] Prellwitz "Griech Etym," s σκήπτω

[14] Of the father

[15] This was really the purpose of all mysteries They create symbolisms of death and rebirth for the practical application and education of the infantile libido As Frazer ("The Golden Bough," I, p 442) points out, exotic and barbaric peoples have in their initiatory mysteries the same symbolism of death and resurrection, just as Apuleius "Metam," XI, 23) says of the initiation of Lucius into the Isis mysteries: "Accessi confinium mortis et calcato Proserpinae limine per omnia vectus elementa remeavi" (I have reached the confines of death and trodden the threshold of Proserpina, passing through all the elements, I have returned) Lucius died figuratively (ad instar voluntariae mortis) and was born anew (renatus)

[16] This does not hinder the modern neurasthenic from making work a means of repression and worrying about it

[17] Compare Genesis xlix 17 "Dan shall be a serpent by the way, an adder in the path, that biteth the horse heels, so that his rider shall fall backward"

[18] Compare with this the Egyptian representation of the Heaven as woman and cow

[19] Freud, "Formulierungen über die zwei Prinzipien des psychischen Geschehens," 1912 *Jahrbuch*, p 1 ff

[20] This form of question recalls the well-known Indian symbol of the world-bearing animal an elephant standing upon a tortoise The elephant has chiefly masculine-phallic significance and the tortoise, like every shell animal, chiefly feminine significance

[21] *Zentralblatt für Psychoanalyse*, Vol II, p 171

[22] The neurotic Don Juan is no evidence to the contrary That which the "habitué" understands by love is merely an infirmity and far different from that which love means !

[23] Spiegel "Erân. Altertumskunde," II, 667

[24] Freud · "Eine Kindheitserinnerung des Leonardo da Vinci," p 57 "The almighty, just God and benevolent nature appear to us as a great sublimation of father and mother, rather than revivals and reproductions of the early childish ideas of them Religiousness leads biologically back to the long-continued helplessness and need of the offspring of man, who, when later he has recognised his real loneliness, and weakness against the great powers of life, feels his condition similar to that of childhood, and seeks to disavow this forlorn state by regressive renewal of the infantile protective powers"

[25] Nietzsche "Frohliche Wissenschaft," Aphorism 157 "Mentiri give heed!—he muses immediately he will have a lie prepared This is a stage of culture, upon which whole peoples have stood One should ponder over what the Romans meant by mentiri!" Actually the Indo Germanic root mentis, men, is the same for mentiri, memini and mens See Walde "Lat Etym," sub mendax, memini und mens

[26] See Freud *Jahrbuch*, Vol III, p 60

[27] Bundehesh, XV, 27 The bull Sarsaok was sacrificed at the destruction of the world But Sarsaok was the originator of the race of men he had brought nine of the fifteen human races upon his back through the sea to the distant points of the compass The primitive bull of Gayomart has as we saw above, most undoubtedly female and maternal significance on account of his fertility

[28] If for Silberer the mythological symbolism is a process of cognition on the mythological stage (*Jahrbuch*, Vol III, p 664), than there exists between this view and mine, only a difference of standpoint, which determines a different manner of expression

[29] This series of representations begins with the totem meal

[30] Taurus is astrologically the Domicilium Veneris

[31] There comes from the library of Asurbanipal an interesting Sumero Assyrian fragment (Cuneiform Inscr, I, IV, 26, 6 Quoted by Gressmann "Altorient Text und Bild," I, p 101):

"To the wise man he said
A lamb is the substitute for a man
He gives a lamb for his life,
He gives the heads of lambs for the heads of men, etc"

[32] Compare the remarkable account in Pausanias VI, 17, 9 ff "While sleeping, the sperma of Zeus has flowed down upon the earth, in time has risen from this a demon, with double generative organs, that of a man, and that of a woman They gave him the name of Agdistis But the gods changed Agdistis and cut off the male organs Now when the almond tree which sprang forth from this bore ripe fruit, the daughter of the spring, Sangarios, took of the fruit When she placed it in her bosom, the fruit disappeared at once, but she found herself pregnant After she had given birth to the child, a goat acted as protector, when he grew up, he was of superhuman beauty, so that Agdistis fell in love with the boy. His relatives sent the full-grown Attis to Pessinus, in order to marry the king's daughter The wedding song was beginning when Agdistas appeared and in delirium Attis castrated himself"

[33] Firmicus "De error prof rel," XXVIII. Quoted by Robertson "Evang Myths," p 136, and Creuzer "Symbolik," II, 332

[34] Pentheus, as a hero with a serpent nature, his father was Echion the adder.

[35] The typical sacrificial death in the Dionysus cult

[36] In the festival processions they wore women's clothes

[37] In Bithynia Attis was called πάπας (papa pope) and Cybele Ma In the early Asiatic religions of this mother-goddess, there existed fish worship and prohibition against fish as food for the priests In the Christian religion, it is noteworthy that the son of Atargatis, identified with Astarte, Cybele etc, is called Ἰχθύς (Creuzer "Symbolik," II 60) Therefore, the anagram of the name of Christ = ΙΗΣΟΥΣ ΧΡΙΣΤΟΣ ΘΕΟΥ ΥΙΟΣ ΣΩΤΗΡ = ΙΧΘΥΣ

[38] Spiegel "Erân Altertumskunde," 2, 76

[39] A Nagel "Der chinesische Kuchengott Tsau-kyun" *Archiv für Religionswissenschaft*, XI, 23 ff

[40] In Spiegel's "Parsigrammatik," pp 135, 166

[41] Porphyrius says ὡς καὶ ὁ ταῦρος δημιουργὸς ὢν ὁ Μίθρας καὶ γενέσεως δεσπότης (As the bull is the creator, Mithra is the Lord of birth)

[42] The death of the bull is voluntary and involuntary When Mithra strangles the bull a scorpion bites the bull in the testicles (autumn equinox)

[43] Benndorf. "Bildwerke des Lateran Museum," No 547

[44] "Textes et Monuments," I, 182

[45] In another place Cumont speaks of "the sorrowful and almost morbid grace of the features of the hero"

[46] Infantilism is merely the result of the much deeper state of introversion of the Christian in contrast to the other religions

[47] The libido nature of the sacrificed is unquestionable In Persia a ram helped the first people to the first sin, cohabitation it is also the first animal which they sacrificed (Spiegel "Erân Altertumskunde," Vol I, p 511) The ram is the same as the paradisical serpent, which was Christ according to the Manichean version The ancient Meliton of Sardes taught that Christ was a lamb, similar to the ram in the bush, which Abraham sacrificed in place of his son Here the bush is analogous to the cross (Fragment V, quoted by Robertson Ibid)

[48] See above "Blood bridegroom of the mother" From Joshua v 2 we learn that Joshua again instituted the circumcision and redemption of the firstborn · "With this he must have substituted for the sacrifice of children, which earlier it was the custom to offer up to Jehovah, the sacrifice of the male foreskin" (Drews "Christusmythe," I, p 47)

[49] See Cumont Ibid, p 100

[50] The Zodiacal sign of the sun's greatest heat

[51] This solution apparently concerns only the dogmatic symbolism I merely intimate that this sacrificial death was related to a festival of vegetation or of Spring, from which the religious legend originated The folk customs contain in variations these same fundamental thoughts (Compare with that Drews "Christusmythe," I, p 37)

[52] A similar sacrificial death is that of Prometheus He was chained to a rock In another version his chains were drawn through a pillar, which hints at the enchainment to a tree That punishment was his which Christ took upon himself willingly The fate of Prometheus therefore recalls the misfortune of Theseus and Perithoos, who remain bound to the rock, the chthonic mother. According to Athenaeus, Jupiter commanded Prometheus, after he had freed him, to wear a willow crown and an iron ring, by which his lack of freedom and slavery was symbolically represented (Phoroneus who in Argos was worshipped as the bringer of fire, was the son of Melia, the ash, therefore tree-enchained) Robertson compares the crown of Prometheus to the crown of thorns of Christ The devout carry crowns in honor of Prometheus, in order to represent the captivity ("Evangelical Myths," p. 126) In this connection, therefore, the crown means the same as the betrothal ring These are the requisites of the old Hierosgamos with the mother, the crown of thorns (which is of Egyptian derivation according to Athenaeus) has the significance of the painful ascetic betrothal

[53] The spear wound given by Longinus to Christ is the substitute for the dagger thrust in the Mithraic bull sacrifice "The jagged tooth of the brazen wedge" was driven through the breast of the enchained and sacrificed Prometheus (Aeschylus "Prometheus")

[54] Mention must also be made of the fact that North German mythology was acquainted with similar thoughts regarding the fruitfulness of the sacrificial death on the mother Through hanging on the tree of life, Odin obtained

knowledge of the Runes and the inspiring, intoxicating drink which invested him with immortality

[55] I have refrained in the course of this merely orienting investigating from referring to the countless possibilities of relationship between dream symbolism and the material disclosed in these connections That is a matter of a special investigation But I cannot forbear mentioning here a simple dream, the first which a youthful patient brought to me in the beginning of her analysis "She stands between high walls of snow upon a railroad track with her small brother A train comes, she runs before it in deadly fear and leaves her brother behind upon the track She sees him run over but after the train has passed, the little fellow stands up again uninjured" The meaning of the dream is clear the inevitable approach of the "impulse" The leaving behind of the little brother is the repressed willingness to accept her destiny The acceptance is symbolized by the sacrifice of the little brother (the infantile personality) whose apparently certain death becomes, however, a resurrection Another patient makes use of classical forms: she dreamed of a mighty eagle, which is wounded in beak and neck by an arrow If we go into the actual transference phantasy (eagle physician, arrow =erotic wish of the patient) then the material concerning the eagle (winged lion of St Mark, the past splendor of Venice, beak =remembrances of certain perverse actions of childhood) leads us to understand the eagle as a composition of infantile memories, which in part are grouped around the father The eagle, therefore, is an infantile hero who is wounded in a characteristic manner on the phallic point (beak) The dream also says: I renounce the infantile wish, I sacrifice my infantile personality (which is synonymous with I paralyze it castrate the father or the physician) In the Mithra mysteries, in the introversion the mystic himself becomes ἀετός, the eagle, this being the highest degree of initiation The identification with the unconscious libido animal goes very far in this cult, as Augustine relates: "alii autem sicut aves alas percutiunt vocem coracis imitantes, alii vero leonum more fremunt" (Some move the arms like birds the wings, imitating the voice of the raven, some groan like lions)

[56] Miss Miller's snake is green The snake of my patient is also green In "Psychology of Dementia Praecox" p 161, she says "Then a little green snake came into my mouth, it had the finest, loveliest sense, as if it had human understanding, it wanted to say something to me, almost as if it had wished to kiss me" Spielrein's patient says of the snake "It is an animal of God, which has such wonderful colors, green, blue and white. The rattlesnake is green, it is very dangerous The snake can have a human mind, it can have God's judgment, it is a friend of children It will save those children who are necessary for the preservation of human life" (*Jahrbuch*, Vol III, p 366) Here the phallic meaning is unmistakable The snake as the transformed prince in the fairy tale has the same meaning See Riklin: "Wish Fulfilment and Symbolism in Fairy Tales"

[57] A patient had the phantasy that she was a serpent which coiled around the mother and finally crept into her

[58] The serpent of Epidaurus is, in contrast, endowed with healing power *Similia similibus*

[59] This Bleuler has designated as Ambivalence or ambitendency Stekel as "Bi-polarity of all psychic phenomena" ("Sprache des Traumes," p 535)

[60] I am indebted for permission to publish a picture of this statuette to the kindness of the director of the Veronese collection of antiques

[61] The "Deluge" is of one nature with the serpent In the Woluspa it is said that the flood is produced when the Midgard serpent rises up for universal destruction He is called "Jormungandr," which means literally, "the all-pervading wolf" The destroying Fenris wolf has also a connection with the sea. Fen is found in Fensalir (Meersale), the dwelling of Frigg,

and originally meant sea (Frobenius: Ibid, p 179) In the fairy stories of Red Riding Hood, a wolf is substituted in place of a serpent or fish

[42] Compare the longing of Holderlin expressed in his poem "Empedocles" Also the journey to hell of Zarathustra through the crater of the volcano Death is the entrance into the mother, therefore the Egyptian king, Mykerinos, buried his daughter in a gilded wooden cow That was the guarantee of rebirth The cow stood in a state apartment and sacrifices were brought to it In another apartment near the cow were placed the images of the concubines of Mykerinos (Herodotus, II, p. 129 f)

[43] Kluge "Deutsche Etymologie."

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